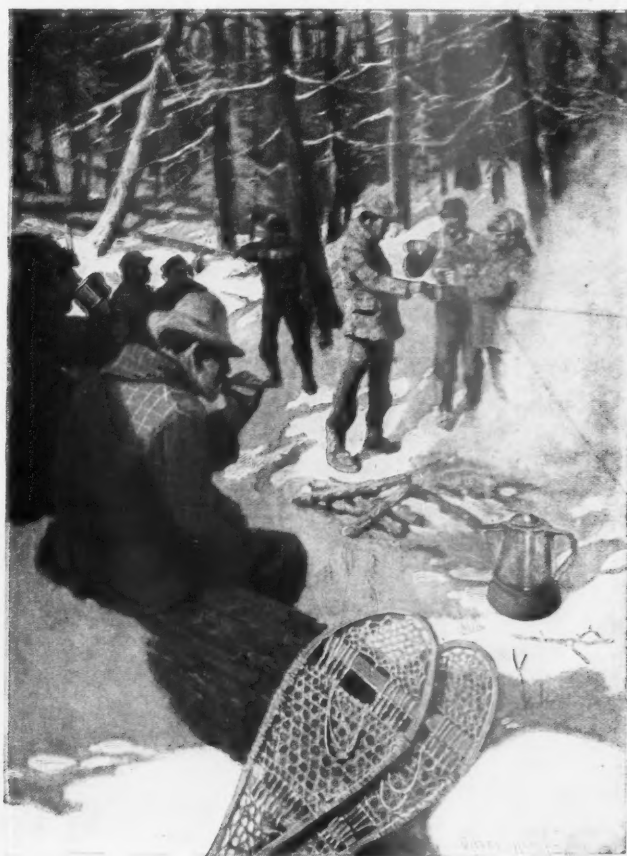


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American Forestry



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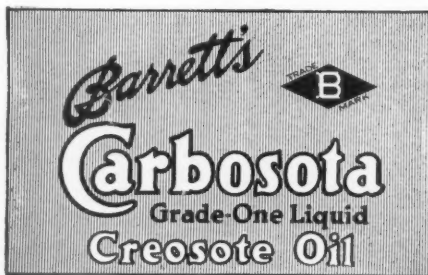


150-ton creosoted coal-bunker. Points of contact of all timbers treated with Carbosota previously to assembling and erecting. Carbosota also applied to the exterior instead of paint. (Courtesy The Milwaukee Electric Railway & Light Co.)

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DONATIONS

FOR THE

RELIEF AND COMFORT

OF THE

FOREST REGIMENTS

Members of the American Forestry Association and others interested in forestry are asked to contribute to the fund now being raised to provide comforts and any necessary relief to the members of the Forest Regiments called for service in France.

These men, there are some 10,000 of them, have the task of supplying for the army of the Allies such absolute necessities as cordwood for cooking and heating, posts for trenches and mines, planks to haul heavy ordnance over, boards for hospitals and billets; ties for railroads, timber for temporary bridges and many other emergency uses. At least 25,000,000 board feet will be needed monthly. This will be obtained from the French forests, the only source available at present, due to lack of water transportation. These forests the French have generously agreed to sacrifice, but desire them cut, as far as it is possible, along forestry lines.

A joint committee has been formed of the lumbermen and forestry organizations of all kinds throughout the country, which will solicit funds and take charge of all sums raised for the comfort and relief of the men in these regiments. All such funds are to be expended to meet the special needs of the men in this special industry. Immediate needs are along the lines of comfort and recreation essential to physical and moral welfare, and later serious relief for soldiers and dependents will be considered. To meet immediate needs members of the American Forestry Association are asked to contribute generously. Reports of the use made of contributions will be published from time to time in all of the lumber and forestry journals.

The Association asks you to stand behind the men of the Forest Regiments who furnish the lumber which, next to ammunition and food, is the greatest need of the Allied army.

All funds are to be sent to Mr. P. S. Ridsdale, secretary of the American Forestry Association, at 1410 H Street, N. W., Washington, D. C.

FILL OUT AND SEND THIS FORM WITH YOUR CONTRIBUTION

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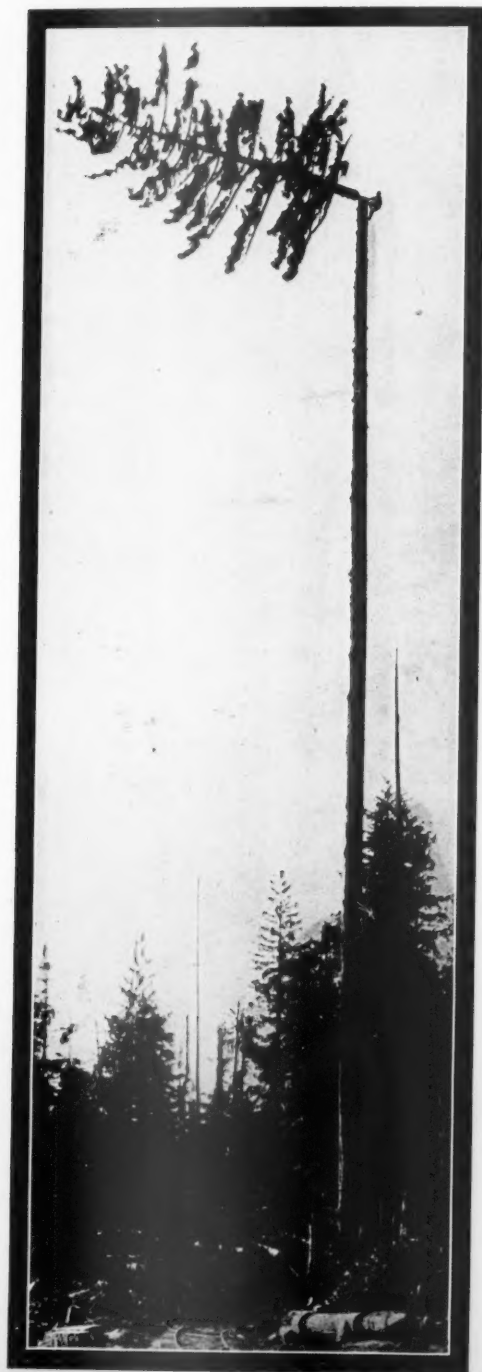
THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

MARCH 1918 · VOL. 24

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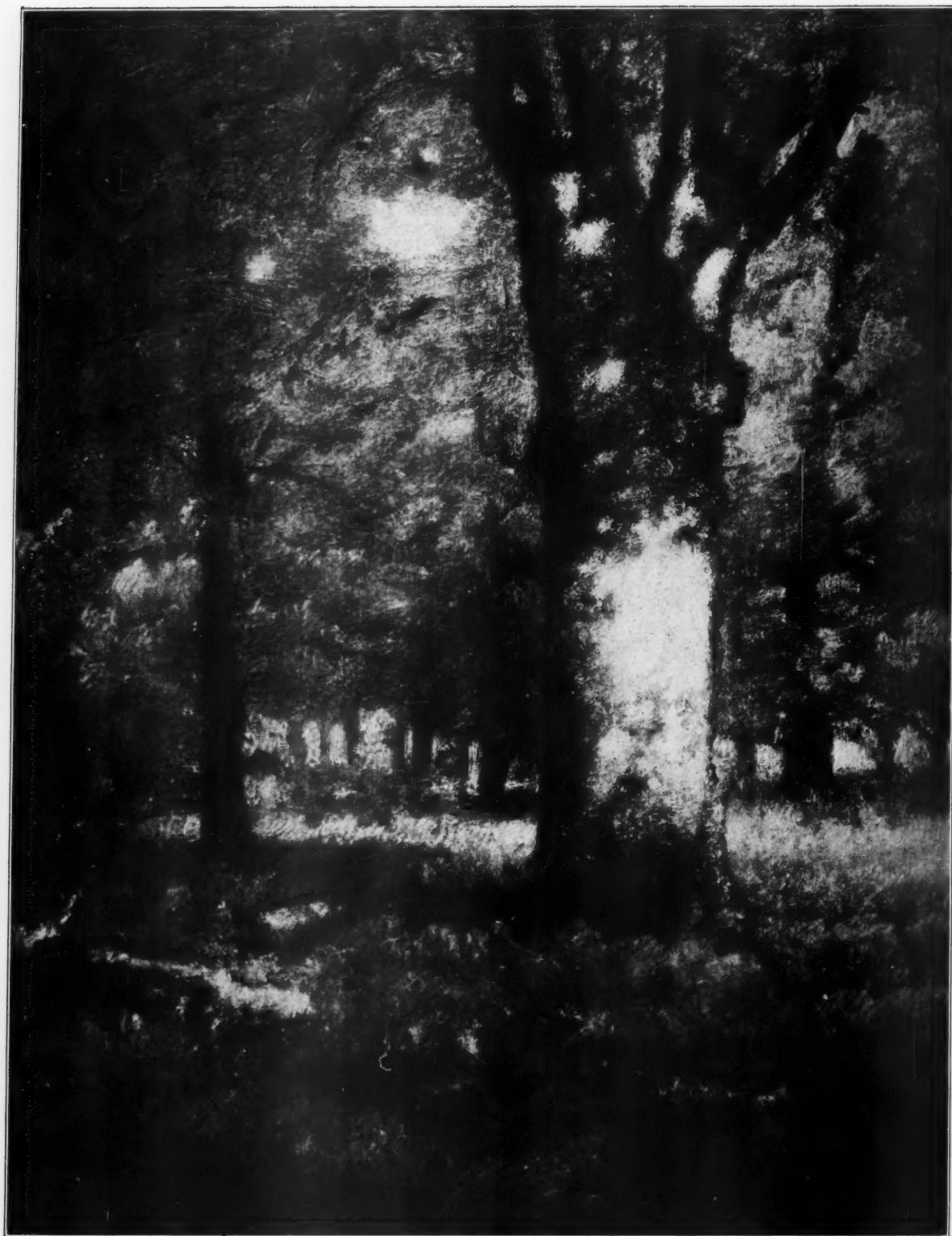
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GIANT TREES FOR UNCLE SAM'S NEED

This is the type of tree, with its fine, clear length of lumber, now being taken from the wonderful forests of Washington and Oregon to meet the war-time emergency in ship and airplane construction. The tree was 190 feet high, and at the point where the top was taken off, 22 inches in diameter. The top was taken off by an expert in twenty minutes.



"THE BEECHES"

A REPRODUCTION, BY COURTESY OF THE NEW YORK TIMES, OF THE BEAUTIFUL PAINTING BY GEORGE INNES WHICH RECENTLY BROUGHT \$10,000—TOP PRICE AT THE AUCTION SALE OF THE ART COLLECTION MADE BY THE LATE JAMES BUCHANAN BRADY. IT WAS PURCHASED BY THE HOLLAND GALLERIES.

AMERICAN FORESTRY

VOL. XXIV

MARCH, 1918

NO. 291

FLYING ON WINGS OF SPRUCE

BY E. A. STERLING

THE aviators of the Allies fly on wings of spruce. From Maine to Alaska the forests are giving of their best in the indispensable spruce for fabricating the framework of these wings of victory.

Lieut. Col. Rees, of the British Royal Flying Corps, while here with the British Mission, said that "the side that has the ascendancy in the air wins the battle. The more spruce we get, the quicker the war will be over."

When complete air supremacy is gained military experts believe the day of victory will be at hand. America has promised the reinforcements in aircraft and men to attain this end and will not fail. The importance of spruce in aircraft production is also indicated by Capt. Dourif, of the French Aviation Service, who is quoted as saying that "Your spruce will

prove the decisive factor in the big European conflict."

American men and machines have already joined the flying squadrons of the Allies in the shrapnel drenched air over the fighting front. The dead-locked trenches

may have taken away what little glamor war ever held, but in the new fighting realm of the sky the spectacular element remains. Our forests have never served a purpose more vital or more dramatic than in furnishing the spruce for these navies of the air.

If the war is ultimately won in the air, the historians will tell only of the critical battles. The imagination thrills in advance at the picture of the Allied aircraft in a concerted forward sweep, bombing, smashing and blinding all opposition, and with control of the air established, leading and supporting the land armies to their objectives. Back of all this, in



Photograph by courtesy of James D. Lacey & Company.

SITKA SPRUCE IN HEAVY STAND

This is typical of the patches or groups of spruce found in many parts of its range. They may occur as small, isolated areas, or as adjacent or connected groups over large forest types where the environment is favorable. Note the typical moss on the upper branches. To locate, select, and cut the best trees in such groups is part of the present activity in aircraft spruce production.

whatever measure it becomes true, and back of all the wonderful air victories already won, is the industrial story of the building of the machines. Some history should record this too.

But what of spruce? In truth it is but one of the many materials in the complex mechanism of the modern flying machine. It was not designed nor patented by anyone; it is not new nor changed; and is only one of many high-class woods. Yet of all known materials, including both wood and metal, it best meets the requirements for the supporting framework of aircraft wings. This is confirmed by Mr. F. R. Pendleton, of the Imperial Munitions Board of Canada, in the statement that "no other wood can take the place of spruce in this work, nor has any substitute been found." The best is certainly none too good, where failure means a fatal fall.

Again quoting Captain Dourif, "spruce is a vital necessity of airplane construction. Our enemies have tried substitutes, but they have been found wanting." We have the spruce. It is known what it will do in actual service and must be had, although the Forest Service has tested and classified in order of merit the other woods which might be used. The most promising of these are Douglas fir, sugar pine and yellow poplar, and some Douglas fir aircraft stock is being cut.

Spruce is an aristocrat among woods. Its outstanding characteristics are strength and lightness. With these qualities are combined elasticity and ability to withstand sudden strain and shock. These features of strength hold only within the elastic limit, but its factor of safety is increased by the uniform texture of the slow-growing, carefully selected wood. Of course, if subjected to strains beyond its strength it breaks like any other wood, but it is dependable in its work up to its maximum load. It gives maximum strength with the lightest weight, when built up or laminated of thin layers

like veneer; yet the same qualities predominate in the solid piece.

It is interesting that the qualities of wood are known, and it is put to its best use, before scientific tests bear out the conclusions and show the reasons for its peculiar fitness for given purposes. The Indians were using spruce canoe paddles when the white man came, and they are the standard today. The same earlier knowledge of adaptability is true of other woods, whether selected for strength, durability, lightness or any combination. There is no record that Solomon maintained research laboratories, yet he selected cedar for his temple, probably because he knew it was durable. But this would be a story in itself.

Of spruce, we have all seen it and used it as a matter of course, with little thought of its special importance until now. We tramp and camp under it in the North woods, most of our newspapers are printed on newsprint containing spruce pulp, the sounding boards in our pianos are of spruce, the frame and walls of many buildings are of the same wood. It is a far cry from these everyday uses to a fighting plane downing a Boche 16,000 feet above the shell-torn trenches on the Western front. It would seem quite as incongruous, if we had not been hardened by nearly four years of the inconceivable, that our spruce forests are being combed for the wood of which the airplanes of the world are built. But the truth is stranger than fiction, and from the farthest separated reaches of our continental forests spruce lumber is being produced, assembled and fabricated by special industrial effort and organization, for a purpose more urgent and

more vital than the world has ever known. Fortunately, America has an adequate supply of spruce for her own needs and for those of her Allies. The enormous difficulties of getting it out in sufficient quantity and in time are rapidly being overcome. The normal



Photograph by courtesy of James D. Lacey & Company.

AN INDIVIDUAL PACIFIC COAST SPRUCE OF PROMISING CHARACTER

Such trees, with long, clean trunks, provide the spruce for wing beams. But not all trees which look promising can be used, because after the labor of felling them and bucking up the lower half into logs, the wood may be found coarse or wavy grained, which is unsuitable. On some areas only 12 per cent of the selected trees meet the specifications.

output, which is entirely insufficient, must be greatly increased. Ordinarily many months of air seasoning were necessary before the wood could be used for high-class work, but the Government Forest Products Laboratory has solved this problem by developing methods of quick seasoning. The lumbermen of America will make good on aircraft spruce supplies, as they have in ship timber production, despite the I. W. W. and kindred troubles.

Yet it was a critical situation which had to be met. For nearly three years before the United States took up the challenge and actively entered the war, the agents of the Allies had been buying aircraft spruce in this country. Dry stocks on hand had been sold and shipped and more than the annual output contracted for. When America's aircraft program sprang into being, the spruce for the planes was still growing in the forests. About the same time, the Allies sought additional contracts, and on top of all this the lumbermen shouldered the ship timber and cantonment lumber orders.

Every hindrance which inspired enemy agents could

devise was put in the way of spruce production. Sabotage and incendiarism, in which selfish labor were the tools, brought a crisis in the mills and forests of the Pacific Coast. Mills were set on fire, machinery tampered with, spikes driven into selected trees and logs, and strikes fomented. This was six months ago. Today the Loyal Legion of Loggers and Lumbermen, with nearly forty thousand of members, holds sway and labor and industry are successfully meeting the situation. To hold in check the traitors and enemies, troops have been enlisted for woods duty, and educational propaganda is being carried on among the loyal workers. But work, energy, and courage are needed to speed up the output and convert the spruce now growing into aircraft wings in France.

Of the spruce forests themselves there is a wealth of description and interest which cannot be told here. Botanical characteristics, with technical facts on distribution, are uninteresting to the average reader. With the emergency demand for aircraft spruce in mind, the ability to visualize the spruce forests, with their new importance and present activities is most to be desired. To do



Photograph by Underwood & Underwood.

BOOMING LOGS FOR WAR-TIME USES

Building a log raft on a small river in the Puget Sound region. After these logs are cut and hauled to the streams, they are made up into cigar-shaped rafts, which are towed to the mills and shipbuilding plants at central points.

this a word of forest description is necessary.

The two species of spruce used in aircraft are the Sitka spruce (*Picea sitchensis*) and Red spruce (*Picea rubens*). The latter is the eastern form; the former confined to the Pacific Coast. In the East the red spruce ranges from the higher elevations of the southern Appalachians in North Carolina to nearly the northern limit of tree growth in Labrador and around Hudson Bay, spreading westward to Minnesota and the plains of Canada. It is of commercial size and value throughout the southern portion of its range, in part of the Lake States, and of great abundance and widest use in southern New England, the Adirondacks and most of eastern Canada.

Red spruce, like other trees, selects the environment

cool, moist flats, and again on the draws, ridge summits and moist slopes of the mountains; elsewhere, it gives way to hardwood, or in the original forests to white pine, or is found scattered or in mixture with balsam, birch, maple and other woods.

In size the eastern spruce in the best stands reaches a diameter of two to three feet, with the average considerably less, and a height of 70 to 80, or even 100 feet. Most of that which is left, and the larger part now cut for pulpwood is of smaller size. As the northern limits of its range are approached, the size decreases, until it is a limby dwarf of no value.

The eastern spruce suitable for aircraft wings is naturally that of the larger size and best quality. For years piano manufacturers have preferred the spruce from the



Photograph by Underwood & Underwood.

ANOTHER PHASE OF WAR-TIME WOODS ACTIVITY

The saws used at the portable mills near the front need filing and constant attention to produce the best work. This picture represents a soldier and a British officer tuning up a circular saw, and is a scene which is probably duplicated daily at the sawmill units of the Tenth and Twentieth Engineers (Forest).

best suited to it, dominating on all such areas except where crowded out by competitive species. In the Appalachian mountains, and on the better soils farther north, it gives way to the hardwoods, its place in the southern mountains being in the cooler upper reaches and on the shallow, rougher ground. In New England and the Adirondacks it is found in almost pure dense stands on

mountains of West Virginia and the Carolinas for sound-ing boards, but little of it is now available. That farther north has the same qualities of slow growth and uniform texture but to secure the grade suitable for aircraft stock means combing forests for the best. From selected saw logs in northern New England, only 5 to 10 per cent meets the specifications. The average from red

spruce is probably not over 3 per cent. Thus to get a million feet (enough for 500 airplanes) means cutting and sawing some 20 million board feet. Assuming a high average of 5,000 feet of select logs per acre, this means cutting 4,000 acres of forest, or 8 acres for every airplane. Then we read that 16 were shot down in one day, and that their average life is two months.

Using the above figures, nearly a half million acres of eastern spruce forest would have to be cut to produce the aircraft lumber now ordered and needed. The obvious impossibility of this led to the early utilization of the Sitka spruce for by far the greater percentage of the aircraft lumber.

in Graham Island, of the Queen Charlotte group, logging facilities and transportation are inadequate; where these are present as in Washington, the spruce is not uniformly distributed and the best spruce areas often beyond the reach of existing logging roads. From Graham Island the spruce logs for the British Government are towed 86 miles to Prince Rupert, or 500 miles to Vancouver to be sawed.

In size the western spruce averages 3 to 4 feet in diameter and 100 or more feet high, with trees 6 to 8 feet through not uncommon. The bark of the mature trees is thin flanked and of reddish-brown color, giving a beautiful effect where the straight, clean columned



Photograph by Underwood & Underwood.

A BIG SITKA SPRUCE READY FOR SHIPMENT TO A SAWMILL

This tree, which was cut in the Gray's Harbor region of Washington, contains 8,500 feet of lumber of the kind used both for aircraft and ship-building. This is by no means the maximum size, spruce trees having been measured which scale 35,000 feet, or on the usual average of 10 per cent aircraft stock, enough for nearly two machines.

Distinctly a Pacific Coast species, the Sitka spruce is found from central California to Alaska, and rarely more than 50 miles from the Coast. It reaches its best development in Washington, northern British Columbia, the Queen Charlotte Islands, and in spots on the lower Alaska coast.

Rarely forming extensive forests in the lower part of its range, and usually comprising not over 10 per cent of the total stand, it is not easy to produce Sitka spruce in large quantity. When found in large, pure stands, as

trunks are grouped under the moss festooned tops. But now their utility, rather than their stately or picturesque beauty appeals to our sentiments.

And to think that after hundreds of years of quiet growth, the fabric they have built will soon serve a vital purpose for humanity over the war-scarred fields of Europe, six thousand miles from where they found environment for their growth. They will not only save lives, but perhaps nations, and America should be more appreciative of her forest resources after the



Photograph by courtesy of James D. Lacey & Company.

HIGH GRADE SITKA SPRUCE IN WASHINGTON

A selected group of which the two left-hand trees would probably be chosen for felling, and the logs either taken to sawmills or riven into spruce stock in the woods.

part they are now playing in the world drama.

Of the practical aspects of western aircraft spruce production, there are many features which call for praise and admiration of the men and the industry which are meeting the emergency. Think of the enormous stretch of Pacific Coast forests, a lumber industry and logging facilities organized to serve a normal market,—then suddenly our emergency demand for spruce in far greater quantities than it was available to existing log roads or mills. The output of spruce in October, 1917, was about two million feet; in March it promises to exceed ten million. This is a record of industrial accomplishment which only loggers or lumbermen can fully appreciate.

A company in a region ordinarily produced say 5 or 10 per cent spruce, this being the percentage in relation to the total output of all woods. Then comes the necessity of greatly increasing this percentage, although the proportion of the species remains unchanged. The spruce needed perhaps stands over the ridge, or on a remote part of the tract not reached by logging roads. The solution was largely one of labor and transportation.

Neither are easy. The labor situation has been mentioned. The transportation—logging roads, and equipment,—cannot be provided in a day, the difficulties being augmented by the nature of the country and shortage of supplies and material.

Again, as in the East, the strict specifications for aircraft spruce mean the possible utilization of only the best trees and a small percentage of the logs. The average for Sitka spruce is about 10 per cent, and this must be watched and perhaps sorted over again to eliminate the coarse-grained wood from too fast growing trees. Then there is the problem of disposing of the lower grades, comprising the remaining 90 per cent. It is an enormous task in both detail and volume.

As a specific illustration of the difficulties encountered in maintaining an output of 10 million feet of aircraft



Photograph by courtesy of James D. Lacey & Company.

BRITISH COLUMBIA SPRUCE

Spruce trees remaining on a windfall area at the north end of Vancouver Island. Hemlock and silver fir originally stood with the spruce, but they have been blown down. Note the man at the foot of the spruce tree in the foreground.

specification spruce per month, a well known forest engineer recently measured up a felled spruce in Clallam County, Washington, which was 90 inches in diameter on the stump and scaled 35,000 feet of merchantable logs. This tree was felled because its external appearance was promising, but the net result from the labor involved was the discovery after the lower half had been bucked up

only about one and a half airplanes, and this was a veritable giant, hundreds of years old and nearly eight feet across on the stump. Part of this lumber, after the labor and care in cutting and selecting, is taken to the new remanufacturing or "cut-up" plant at Vancouver, Washington, which has facilities for converting 350,000 feet a day into the finished aircraft stock.



Photograph by courtesy of James D. Lacey & Company.

BRITISH COLUMBIA SPRUCE FOREST

A dense stand of sitka spruce in the vicinity of Nimpkish Lake, Rupert District, British Columbia. Some of the difficulties of logging such timber are apparent from the picture, both the size and location of the trees requiring heavy equipment and railroad transportation. The man at the base of the tree on the right-hand side indicates the large size of the trees.

into logs, that it would not meet the government specifications. The only thing the matter was a slightly spiral grain, with minor irregularities. It would help greatly if the authorities knew a little more about lumber, and did not demand wood of a character which does not grow, even in the greatest forests and the most perfect trees. They can never make wood, and should remember that it is a product which must be selected from Nature's manufacturing plant.

On the operation just referred to, only about one tree out of five looks sufficiently promising to justify felling, and out of about one million feet cut the total amount of airplane stock accepted by the government inspector was about 120,000 feet. This amounts to 12 per cent of the trees felled, but less than 3 per cent of the spruce on the area cut over. One tree such as that measured, if accepted would produce enough spruce for

The present call is for ten million feet of aircraft spruce per month. This requires cutting one hundred million feet of spruce logs. Since the spruce cannot economically be cut without the associated species, this actually calls for an output of from four hundred million to one billion feet of logs a month, depending on whether the spruce averages 25 per cent or 10 per cent of the stand. It is not exactly a job for amateurs.

Co-ordination of effort, and concentration of action, as far as the lumbermen are concerned, assures the necessary spruce output for the aircraft program of this country and our Allies. Special mills, extra logging facilities, riven stock from selected trees, remanufacturing plants and other emergency measures are increasing the spruce production. The forests of America are making good. The wings of spruce are being fabricated, and, if it does not come sooner by other means, may they surely prove the wings of victory.



Photograph by Underwood and Underwood.

"THE DEAD HILLS OF THE MEUSE"

THE ABOMINATION OF DESOLATION

TAKEN from "They Shall Not Pass"—the striking story on the battle of Verdun by Gouverneur Morris, in the issue of Collier's Weekly for February 2, 1918:

"Two years ago . . . the forests that clothed the surrounding hills from crest to valley looked pleasant and inviting, and, so far as I am concerned, any real reasons for thinking that Verdun and Hell were going to meet each other halfway and become one and inseparable simply did not exist . . .

"In 1915 there was no very expansive view to be had from any of these hills; forests clothed them from top to bottom, forests of beech, oak, and cone-bearing trees. In whichever direction the eye sought an escape it was arrested by the trees. But today, square mile after square mile—there is nothing left that you could fairly call a tree. It is as if after long months of dry weather the forest had caught fire and burned to the ground. Here and there the black skeleton of a tree twists Jap-anesquely against the sky. That is all. The eye is no longer a prisoner. It roams at large, and has for a boundary to its wanderings only some elemental substance higher than that from which it starts to wander.

It was not enough to destroy the forests; there is no longer any forest floor.

"Lovers used to stroll arm in arm through the well-ordered forests of Verdun. To stroll arm in arm where these forests once stood is no longer possible. You must go alone. If there has been rain, you should have nails in your boots. The smooth convolutions of the hills have been tortured and turned into ridges and hollows like the Atlantic Ocean during the equinoctial gales.

"I doubt if there is to be found one single square yard of the original forest floor. I doubt if there is to be found one single perfect example of a shell crater. One crater breaks into the next; and there, merged into one shocking hollow, are a dozen which at the first moment of looking appeared to have been but one.

"It has been well and truly 'worked,' that forest floor; but not for a hundred years can it ever again be worked by man in any peaceful and profitable pursuit. Rich soil (doubly rich now), it will be shunned by the farmer with his plow; a prospect very rich in copper and iron, the prospector will shun it; for here, buried and half buried, the shells, great and little, which did not explode at all, are as thick as temptations in the life of Everyman."

AMERICANS IN THE FRENCH FORESTS

Addressed to the Members of the United States Forest Service

BY HENRY S. GRAVES, FORESTER

I WANT to tell you something about the work of the forest regiments in France, and something also of other impressions I received of the war during my period of service. I know that every member of the Forest Service is doing whatever he or she can find to do to contribute toward this great enterprise, an enterprise which means so much to this country as well as to the whole world. I realize, too, that you are anxious to know as much as possible of what is going on in France, and what your friends and relatives are doing there. In the limited space at my disposal I must confine myself to the matters I think will be of most interest to you, that can be discussed.

My task in France was to prepare the way for the Tenth and Twentieth Engineers and auxiliary troops that were to go over to work in the French forests. An organization to handle the work has been built up; forests have been secured, partly through grants by the French Government, partly by purchase from private owners; a procedure for acquiring additional forests has been established; and the actual work of logging and milling is well under way. Aside from the main headquarters, an effective district organization has been established. When my work in France was completed and I left for home—some three or four months behind the original schedule—Major Greeley took my place at headquarters of the Lines of Communications in charge of the technical forestry work, and Colonel J. A. Woodruff, who has done such admirable work in organizing the Tenth, was in military command of the forestry troops.

I shall try to take you with me in imagination on a typical field trip in the French forests, such as I took last October in company with Major R. E. Benedict, the commanding officer of the district. Our object was to inspect an encampment of a section of the Tenth Engineers which had been established only a few days before. We drove in a Government automobile through a beautiful forest country, over splendid roads lined with sycamore trees,—at that time of the year in yellow leaf,—with a background of green pines. (I wonder if we have ever thought of planting sycamore in our pine regions to get that effect).

The people of the villages through which we passed were quick to recognize the American uniform, chiefly by our service hats, or "Pershings" as the French often call them, and greeted us with the greatest cordiality. Finally we came to a little village and observed near the railroad station a crowd gathered to watch some curious operation. Coming nearer, we saw a group of husky American lumberjacks working up fifty-foot pines preparatory to loading them on the cars. As we came to a stop, Captain D. T. Mason, formerly of Missoula, greeted us. These were the first trees cut in this dis-

trict; they had been felled and taken out of the woods within three days after the men had left the train which brought them there—and they did not have a single horse.

Then we went on a little farther through the pine woods to a beautiful camp. There were rows of Sibley tents, and men moving here and there, all busy, all with a definite purpose. Some were putting up shelters for horses which they expected in a day or two. Captain J. D. Guthrie and Captain I. F. Eldredge met us. They told us how quickly the camp had been put up and the men established, and how they had astonished every one in that section by their speed. As we went about I heard ringing through the French forests, "Watch out below." Then a tree would crash down, and I would know that another pile was being prepared for the docks that are to receive the many troops and the great quantities of supplies that we are sending over there.

I wish you could have seen those men in the woods. They had had a long and trying trip across the water; they had been taken through France, not in Pullmans, but in the only kind of cars available for transporting them at the time; they had to make camp in a hard storm. Yet they accepted it as all troops in France are accepting such conditions. And now, when they were at last in the woods, they were swinging their axes, troubles forgotten—joyful, singing, shouting, happy, well—everybody working hard and thinking how his particular tree was going to serve some particular purpose that would help our soldiers to final victory. They had not waited for horses; they were picking up the logs by man power and getting them out as best they could with the aid of a logging truck improvised from a supply wagon. What did they care whether they had horses or not! They were at their goal; the work was right in front of them; they were eager to get at it; and they were getting at it with all their might.

They were a fine body of men. Not all saints, of course. There were two of them, for example, who had been a little slow to pick up the military end, but whose boast had always been that, while they might not be much at drilling, they were "hell on cutting down trees." These men, as it turned out, were the first crew to fell a tree for the American soldiers in France. Not unnaturally, perhaps, they felt that they ought to celebrate, which they did, with the result that it took four men to put them in the guard house. But the affair had its good ending, for the local mayor ordered that no more liqueurs be sold to men wearing the American uniform. Let it be added that the men took this in good part, just as they have taken in good part every other restriction necessary for maintaining the highest efficiency.

And they are doing other fine things, too. They are endearing themselves to the people of the place where they are at work. It means a good deal when a soldier,

coming along the road, sees an old woman with a wheelbarrow—a heavy barrow—and, gently pushing her way, takes the handles and trundles it himself. At Christmas each company at that camp raised 700 francs for a celebration and gifts for the children of the neighborhood. These may be little things, but there are going on in France lots of other little things like them that cut deep. The people appreciate it, and I heard about it wherever I went.

I could take you, if I had the time, to other parts of France where other units of the Tenth and Twentieth Engineers are located that present a similar picture—a different class of timber, perhaps, somewhat different logging conditions; somewhat different living conditions; but essentially the same. In the colder parts of the mountains the men have established themselves in comfortable barracks; in other places where it is not so cold they prefer to live in tents with board floors. In all the camps are being established buildings for recreation and amusement.

At the time I left France all of the men in the Tenth and Twentieth Engineers were in splendid health. They are living under healthful conditions, and this accounts for it. I was told just before I came away that in one group of camps containing 400 men there was not a single case in the hospital.

Without going into details, I can assure you that the Army Engineers are doing a splendid work in forestry—work that is essential for our American forces abroad, and of a kind to secure the hearty appreciation of the French. The efficiency of our men and our operations in the woods wins, I think I may say without undue boastfulness, the admiration of the French foresters. At the same time we have been able to adjust ourselves satisfactorily to their conditions, the conditions arising from their methods of handling the forests as a permanent resource. The Tenth and the Twentieth are working right together in this important task of the Engineers. Colonel Woodruff on the other side and Colonel Mitchell on this side are seeing to it, most admirably, that these indispensable forest regiments are organized and handled along lines to give them high efficiency, as military and industrial units. The lumber industry of the country and the foresters of the country may each take pride in the share which they have taken and are taking in the work. Without the participation of both lumbermen and foresters, the result could not have been what it is and will continue to be.

I was fortunate to arrive in France early enough to see something of the first expression of welcome by the French people to the American troops. I was in Paris on the Fourth of July when several companies of American Infantry marched through the city. I saw the enthusiastic greeting accorded them. And I was struck with the eager expression on their faces; some of them veterans and marching splendidly, others newer at the game and a little timid lest they should not keep a good line, but all fresh, young, stalwart, enthusiastic. Behind them marched one of the star companies of one of the

star regiments of France—a regiment with a splendid record for valor. It was tremendously impressive to see American soldiers marching through Paris and French troops marching with them. It typified the union of two great nations in a common cause.

That evening officers of the French Army in Paris gave the American officers a dinner at the Military Club. The club is on the Avenue de l'Opera, a broad and beautiful thoroughfare. When I arrived there, a few minutes late, I found an enormous crowd packing the streets, through which policemen had to clear a way for us. The minute the people saw the American uniform there were great cheers, vivas, and almost every other mark of enthusiastic greeting. About half an hour after we sat down to dinner a French officer came in and said that the people would not go away and that the crowd was bigger than ever. A balcony runs around the club, and we all went out on that. Never before in my life have I heard or seen such cheering and enthusiasm. The people forgot themselves; they threw their hats in the air with no thought of ever getting them again; they waved and cheered, and cheered again. Along the balcony were draped American and French flags. We tore these from their fastenings and, waving them together, led the crowd in singing the Marseillaise. They kept up the demonstration for a full half hour. It was representative of how the French people feel and of the spirit in which they are receiving us; not as saviors, not as a people coming over to rescue France, but a people, a nation, coming from across the sea to fight side by side with France.

My work took me pretty largely back of the lines, and in those early days I was usually the first American officer who had come to the places where I went. The papers had published pictures of General Pershing and of the typical American soldier, and everywhere people recognized us by our hats. As we drove through the villages the children would rush out into the street shouting "Les Americains! Les Americains!" Then the older people would run out, cheering and waving their handkerchiefs. It was a delightful and a tremendously affecting experience.

It happened that I was the first American officer at a number of camps where German prisoners are kept. One such camp was in a Government forest that we are going to take over, where the prisoners were being employed to get out cordwood and some small timber. If it had not been for the presence of the Boches, the camp would have reminded you of a fairly well organized lumber camp in the North Woods. The men had their bunks and little mattresses to lie on. They worked in the forest, with a large measure of liberty, and they seemed to be in very good health. They had their own German cooks to prepare their kartoffelsuppe and other things that they like. The bread they got was perhaps not quite so good as that furnished the French soldiers, but it was plenty good enough and nourishing. While at this camp I reviewed the prisoners. I rather imagine that the French officer who suggested the procedure had

in mind to impress upon the Boches that Americans were in France. At all events they had the opportunity to see for themselves that it was a fact, and I am glad to have been the means of conveying it to their minds.

The night before I left Paris, which was New Year's Eve, a number of officers of the forest organization who happened to be in town gave me a little dinner. Of our old Forest Service men there were present Major Greeley, Major Woolsey, Major Peck, Captain Stuart, Captain Bruce, Captain Ringland, Captain Moore, Captain Granger, Lieutenant Wolfe, and Lieutenant Agee. One of the things which they asked me to do was to tell the members of the Forest Service here how much they and all the men working in forestry in France appreciate the sweaters and other useful articles you are sending them. I can assure you that this is not simply a polite expression of thanks. I have seen the men, in camp, in the fields, and at headquarters, when they have received the things you have sent; perhaps yourselves have made them. I know what it means to them, not only from the standpoint of sentiment, but also from that of real comfort.

On the way home I got a little glimpse into the work of the Navy that impressed me tremendously. It was a long trip, but one which I would not have missed for anything. It did not, after all, seem such a serious matter to run the submarine blockade, for there were the destroyers to protect our ships, but it did seem a pretty serious matter for a light boat—they do not, of course, bring back as heavy loads as they carry over—to run the blockade of six very severe North Atlantic storms, which is what we did. You feel a whole lot different in a storm—one, for example, which necessitates the ship turning back toward France, as we had to do twice—when you have confidence in those who are in command of the ship, and when you have seen the crew of that ship, a splendid, disciplined body of young men. Those were the kind of officers and men we had on our ship, and so far as my own observation goes and from what others have told me I am confident that these are the kind of men of which our whole Navy is made up.

Another thing which impressed me when I got back here was the tremendous things which this country is doing. We have really got to judge our progress in this war by perspective; we have got to judge it by periodical progress; by achievement during a period; and by results. It is results that count, and they are the only things that do count. That is the first thing that one learns when he goes into the Army. There are no excuses in the Army—or in the Navy either, I presume. When an order is given it must be carried out. There are no reasons why it can not be carried out, because it has got to be carried out. And that is the only way that the war can be won. So to judge of our progress by achievement is, I think, the only way to obtain a true viewpoint, one in which we will not be deceived by something near at hand that may possibly obscure real accomplishment.

In France, of course, one gets very close to the war, and so perhaps appreciates a little more what we are

doing. One sees more vividly the terrible consequences of war, the sorrow and distress of the people, homes broken up, homes ruined, industries destroyed, economic conditions overturned.

It is not necessarily hate that is in one's heart; it is more a realization of what a monstrous thing it is that has possessed a nation, perverted its sense of honor, crushed its sense of the proprieties and decencies, and made it do monstrous things. The world has been made an impossible place to live in until this monstrous thing, however you express it, personally or impersonally, individually or collectively, is swept away. Not until then can we follow peaceful pursuits, not until then can we know that our homes are not going to be wiped out, that happiness is not going to be destroyed, that unhappiness is not going to be spread through our land, let alone other lands. I do not see how any one who comes at all in contact with this war can feel any other way. And the feeling that I have and that every man has who has seen this war at close range is spreading farther and farther away from the center of things and is entering deeper and deeper into the hearts of the people of this country; the realization of this terrible thing that has been forced upon the world, that has been forced upon us, and for the cure of which we count it our duty, our privilege, and our joy to make every sacrifice.

FROM the *Southern Lumberman* of October, 1890, is taken the following interesting quotation:

"Regarding the longevity of European trees recent information gathered by the German Forestry Commission assigns to the pine five hundred and seven hundred years as a maximum, four hundred and twenty-five years to the silver fir, two hundred and seventy-five years to the larch, two hundred and forty-five years to the red beech, two hundred years to the birch, one hundred and seventy years to the ash, and one hundred and thirty years to the elm. The heart of the oak begins to rot at the age of three hundred years. A *sequoia gigantea*, felled in Calaveras county, California, had attained the age of three thousand years. It was three hundred and eighty-seven feet in height, and measured fifteen feet in diameter, one hundred and twenty-five feet above the earth. The Bradburn yew, in Kent county, England, had attained the same great age. The dean of trees of the a few years ago in the vicinity of Boston. Prof. Abbott, beneath its shade."

THERE is a demand for trained men with skill in fruit growing, and a number of positions promise to be available. The State College of Agriculture at Cornell, Ithaca, N. Y., in offering a free course in fruit growing to residents of New York State, says it does not guarantee positions to those who take the course, but feels that it will be able to place many who desire to gain experience in commercial work. A few exceptional students, it adds, may be placed as foremen or superintendents on fruit farms.

FOREST SERVICE MAN SELECTED AS CITY MANAGER OF ALBUQUERQUE

IN selecting a man to serve as its manager, the city of Albuquerque, New Mexico, reached into the Forest Service and picked out Paul G. Redington, who has recently held the position of district forester of the Southwestern National Forest District.

Mr. Redington was born in Chicago, Illinois, January 25, 1878; and gained his early education in the public and high school of Evanston, Illinois. He was graduat-



PAUL G. REDINGTON, WHO LEAVES THE FOREST SERVICE TO BECOME CITY MANAGER OF ALBUQUERQUE, NEW MEXICO

ed from Dartmouth College in 1900 with the degree of bachelor of arts, and after two years in the employ of a large Chicago concern he entered the Yale Forest School, graduating in 1904 with the degree of master of forestry. He then entered the Forest Service of the United States and gradually won promotion through the various grades, including that of supervisor of the Sierra National Forest. The distinction of his selection as City Manager of Albuquerque is an honor well deserved.

F. R. BARNES, of St. Louis, who entered the Twentieth Engineers (Forest) as a captain, was recently promoted to major in the regiment.

BLASTING STUMPS NEAR BUILDINGS

BY JOHN N. LEWIS

THE accompanying view shows the stump prepared for the blast. It will be noted that it has been heavily covered with cedar boughs to prevent flying pieces from breaking windows of the house nearby.

When blasting is done near buildings it is important that the blaster should know how to load the charge so that the main body of the stump will be thrown away from the building rather than toward it. To accomplish this, the charge should be placed on the side of the stump nearest the building. It is not good practice to load a charge under one side of a stump, but much better to center the charge under it. When a charge is centered it usually splits the stump into several pieces, which are likely to be thrown in several directions. When loading this way it is advisable to have the charge two and one-half or three feet in the ground under the stump.



HOW TO BLAST SAFELY NEAR HOME

By observing a few simple rules, blasting may be done with perfect safety, as in this case, where the stump blasted was within thirty-five feet of the house.

The stump shown in this picture was within thirty-five feet of the bay window of the house. This window was not injured and no dirt was even thrown upon the white clothes shown on the clothes line. I find it advisable to raise the windows about two inches before blasting to prevent their being broken by the jar or shock of the explosion.

The stumps that were taken out were sixteen and twenty inches, respectively, in diameter; both were surface-rooted. Three and one-quarter pounds of 40 per cent dynamite, six feet of fuse and two blasting caps were used on the job. These cost about 70 cents.

"PERHAPS OUR GREATEST NATIONAL PARK"

BY ROBERT STERLING YARD

CHIEF, EDUCATIONAL SECTION, NATIONAL PARK SERVICE

EAST and north of the Sequoia National Park lie a thousand square miles of summits, lakes and valleys that outclass most of the celebrated scenic spots in other lands, and even challenge, for sheer sublimity, any other equal area in the United States. It is a little known land whose eastern border is the summit of the Sierra Nevada Mountains and whose western slopes include two valleys which are destined to a celebrity scarcely second to that of the famous Yosemite. The time will come when the climb to the summit of Mount Whitney and the lure of the Tehipite Valley and the Kings River Canyon will bring sightseers from abroad.

This little-known mountain-top country of spectacular charm and the "big tree national park" adjoining, although so different, are really one. It is the quality of supremacy common to both that makes them one even more than their contiguity. From the lowest valley of the national park with its unmatched forest giants up to the unmatched mountain climax of Whitney, supremacy of one kind or another is constant. There is no break, no let down. The entire combined area, sixteen hundred square miles including the national park, is of one piece; and when Congress enlarges the park to include the rest, we

will possess a national park unequalled outside of America, even in Switzerland, and unexcelled even in America. And, what is more, it will be no repetition of other national parks; on the contrary, it will possess personality in high degree. There will be and can be no other like it.

It is through much of this country that the State of California is building its memorial, the John Muir Trail, to the genius of the Sierra Nevada. This was John Muir's own country. Over these lofty passes he toiled, in these valleys he studied and dreamed. The spirit of his legacy of literature is the very spirit of the land itself.

Mount Whitney is known to the country at large as the highest mountain in the United States. Its altitude is 14,501 feet. But that so little expresses what Whitney is, that almost it might better not be said. Mount Whitney really is a climax. Here the Sierra has wonderfully massed her highest mountains, tumbling them willfully, recklessly into one shapeless, sprawling, gigantic heap as if it were the dumping ground for all that was left over after the making of



THE RIVER—KINGS RIVER CANYON

It is said to be the most beautiful stream in California, and this typical bit of a view in the canyon bears strong testimony to the origin of its enviable reputation.

America. For miles from north and west and south, the approaching traveler encounters an ever more raging sea of huge white-capped peaks. Out of this mass emerges one just a little higher than the rest. That is Whitney.



UP THE CANYON FROM THE COPPER CREEK TRAIL

Showing the Sphinx, and, in the center, Sunset Peak. This peak exhibits the most wonderful sunset effects. As the sun sets the peak lights up with a fiery red color, which gradually dies out as darkness fills the canyon, and when it is almost night in the canyon Sunset Peak is lit up by a weird sort of afterglow.

The journey to Whitney summit is undertaken every summer by a few who know the wonderful experience. It is a progress of inspiration and climax; and yet it is easy going, for the trail marvelously finds a way and the weather is always perfect. It does not rain in this Sierra paradise from the end of June to the middle of October. Campers do not bother to carry tents. The day will come when many hundreds will make the journey every summer. An automobile road is possible to the very summit, and I have no doubt that some day, after this country is included in the national park, the road will be built.

In the hollows of these vast mountains lie uncountable fields of perpetual snow and a few glaciers. From these trickle westward a million tiny streamlets. The streamlets combine into brooks and the brooks feed many hundreds of lakes, and the lakes overflow into creeks, and the creeks join rivers. In time these rivers make their way to broad fertile valleys and finally to the sea; but before that, while still among the mighty mountains, they foam and thunder through mighty canyons. Two of these, the Tehipite Valley and the Kings River Canyon are among the wonders of the land.

Both valleys are larger than Yosemite. Both, like Yosemite, are guarded by gigantic rocks. I had the opportunity a year ago last summer to compare all three.

We approached Tehipite from the north and upon an elevation high above the valley floor. Lookout Point, a

couple of miles south, afforded our first sensation. Here the rising trail emerged upon a broken mass of rock standing well out over the head of the canyon and 3,000 feet above it, disclosing Tehipite Dome in full relief. It is one of the great views, in fact it is one of the very greatest of all our views, and by far the grandest valley view I have looked upon, for the rim view into Yosemite by comparison is not so grand as it is beautiful.

The canyon revealed itself to the east as far as Mount Woodworth, its lofty diversified walls lifting precipitously from the heavy forests of the floor and sides, and, from our high view point, yielding to still greater heights above. Enormous cliffs abutted, Yosemite-like, at intervals. South of us, directly across the canyon, rose the strenuous heights of the Monarch Divide, Mount Harrington towering 1,000 feet higher above the valley floor than Clouds Rest above the Yosemite.

Down the slopes of the Monarch Divide, seemingly from its turreted summits, cascaded many frothing streams. Happy Gap, the Eagle Peaks, Blue Canyon Falls, Silver Spur, the Gorge of Despair, Lost Canyon—these were some of the romantic and appropriate titles we found on the Geological Survey map.

And, close at hand, opposite Mount Harrington and just across Crown Creek Canyon, rose mighty Tehipite. We looked down upon its rounded glistening dome. The Tehipite Dome is a true Yosemite feature. It compares in height and prominence with El Capitan. In fact, it

stands higher above the valley floor and occupies a similar position at the valley's western gate. It is not so massive as El Capitan and, therefore, not so impressive; but it is superb. It is better compared with Half Dome, though again not so impressive. But it has its own august personality, as notably so as either of these world-famed rocks; and, if it stood in the Yosemite, would share with them the incomparable valley's highest honors.

From the floor, the whole aspect of the valley changed. Looking up, Tehipite Dome, now outlined against the sky, and the neighboring abrupt castellated walls, towered more hugely than ever. We did not need the map to know that some of these heights exceed Yosemite's. The skyline was fantastically carved into spires and domes, a counterpart in gigantic miniature of the Great Sierra of which it was the valley climax. The Yosemite measure of sublimity, perhaps, lacked, but in its place was a more rugged grandeur, a certain suggestion of vastness and power that I have not seen elsewhere.

This impression was strengthened by the floor itself, which contains no suggestion whatever of Yosemite's exquisiteness. Instead, it offers rugged spaciousness. In place of Yosemite's peaceful woods and meadows, here were tangled giant-studded thickets and mountainous masses of enormous broken talus. Instead of the quiet winding Merced, here was a surging, smashing, froth-

ing, cascading, roaring torrent, several times its volume, which filled the valley with its turbulence.

Once step foot on the valley floor and all thought of comparison with Yosemite vanishes forever. This is a different thing altogether, but a thing in its own way no less superlative in its distinction. The keynote of the Tehipite Valley is wild exuberance. It thrills where Yosemite enervates. Yet its temperature is quite as mild.

The Kings contains more trout than any other stream I have fished. We found them in pools and riffles everywhere; no water was too white to get a rise. In the long greenish-white borders of fast rapids they floated continually into view. In five minutes' watching I could count a dozen or more such appearances within a few feet of water. They ran from 8 to 14 inches. No doubt larger ones lay below.

So I got great fun out of picking my particular trout and casting specially for him. Stop your fly's motion and the pursuing fish instantly stops, backs, swims round the lure in a tour of examination and disappears. Start it moving and he instantly reappears from the white depth where no doubt he has been cautiously watching. A pause and a swift start often tempted to a strike.

These rainbows of the torrents are hard fighters. And many of them, if ungently handled, availed of swift currents to thresh themselves free.



KEARSARGE PINNACLES AND THE LAKE

The Pinnacles were once called "The Devil's Backbone"—and most appropriately, judging from this view of their jagged outline, but even at that it is exceedingly difficult to associate anything so cool looking and generally beautiful with his satanic majesty. The Lakes are on the very edge of the timber line, being at an elevation of eleven thousand feet.

You must fish a river to appreciate it. Standing on its edges, leaping from rock to rock, slipping thigh deep at times, wading recklessly to reach some pool or eddy of special promise, searching the rapids, peering under the alders, testing the pools; that's the way to make friends with a river. You study its moods and its ways as those of a mettlesome horse.

And after a while its spirit seeps through and finds your soul. Its personality unveils. A great friendliness unites you, a sense of mutual understanding. There follows the completest detachment that I know. Years and the worries disappear. You and the river dream away the unnoted hours.

The approach to Granite Pass en route from the Tehipite Valley to the Kings River Canyon was nothing short of magnificent. We entered a superb cirque studded with lakelets. It was a noble setting. We could see the pass ahead of us on a fine snow-crowned bench. We ascended the bench and found ourselves, not in the pass, but in the entrance to another cirque, also lake-studded, a loftier, nobler cirque encircling the one below.

But surely we were there. Those inspiring snow-daubed heights whose sharply serrated edges cut sharply into the sky certainly marked the supreme summit. Our winding trail up sharp rocky ascents pointed straight to the shelf which must be our pass. An hour's toil would carry us over.

The hour passed and the crossing of the shelf disclosed, not the glowing valley of the South Fork across the pass, but still a vaster, nobler cirque, sublime in Arctic glory!

How the vast glaciers that cut these titanic carvings must have swirled among these huge concentric walls, pouring over this shelf and that, piling together around

these uplifting granite peaks, concentrating combined effort upon this unyielding mass and that, and, beaten back, pouring down the tortuous main channel with rendings and tearings unimaginable!

Granite Pass is astonishing! We saw no less than four of these vast concentric cirques, through three of which we passed. And the Geological Survey map discloses a tributary basin to the east inclosing a group of large volcanic lakes and doubtless other vast cirque-like chambers.

We took photographs, but knew them vain.

A long, dusty descent of Copper Creek, which McCormick correctly diagnosed as something fierce, brought us, near day's end, into the exquisite valley of the South Fork of the King's River—the Kings River Canyon.

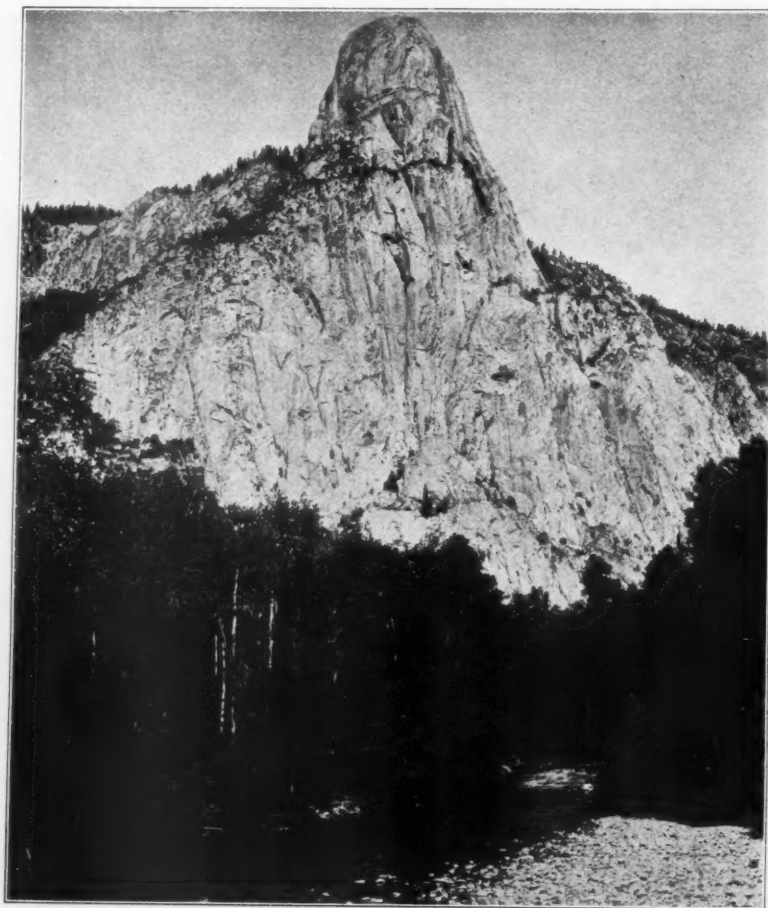
Still another Yosemite!

It is not so easy to differentiate the two canyons of the Kings. They are similar and yet very different. Perhaps the difference lies chiefly in degree. Both lie east and west, with enormous rocky bluffs rising on either side of rivers of quite extraordinary beauty. Both present carved and castellated walls of exceptional boldness of design. Both are heavily

and magnificently wooded, the forests reaching up sharp slopes on either. Both possess to a marked degree the quality that lifts them above the average of even the Sierra's glacial valleys.

But the outlines here seem to be softer, the valley floor broader, the river less turbulent. If the keynote of the Tehipite Valley is wild exuberance, that of the Kings River Canyon is wild beauty. The one excites, the other lulls. The one shares with Yosemite the distinction of extraordinary outline, the other shares with Yosemite the distinction of extraordinary charm.

The greater of these two canyons is destined to be-



AN IMPOSING EXAMPLE OF NATURE'S SYMMETRICAL SCULPTURE

Probably one of the most wonderful specimens of dome topography in the world, Tehipite Dome rises in sheer majesty three thousand eight hundred feet high from the Middle Fork of the Kings River.



THE EASTERN FACE OF MOUNT WHITNEY

Whitney, with an altitude of 14,501 feet, is best known to the general public as the highest mountain of the United States. But there is really no possible word description of the awe it inspires in the traveler as he approaches it from north, west or south.



AND NOW THE SUMMIT

From a sea of white-capped peaks rises the summit of Whitney, the highest of the Sierras. The journey to the top is a wonderful experience filled with beauty and inspiration. Seemingly difficult, it is easy going, for the trail is fine, and the weather nearly always perfect.

come famous under the name of its part, the Tehipite Valley; the lesser will have the undivided possession of the title, Kings Canyon. Tehipite is as distinctive and unusual a name as Yosemite. But the Middle Fork of the Kings is by far a greater stream from every point of view than the beautiful South Fork.

Looking ahead, this canyon of the South Fork seems destined to the quicker and the greater development. It is broader, flatter, and more livable. It lends itself to hostelry, of which two already exist. It is more easily reached and already has some patronage. Moreover, from its name and position, it is the natural recipient of whatever publicity grows out of both. Tehipite has to build from the ground up.

There are few nobler spots than the junction of Copper Creek with the Kings. The Grand Sentinel is seldom surpassed. It fails of the personality of El Capitan, Half Dome, and Tehipite, but it only just fails. If they did not exist, it would become the most celebrated rock in the Sierra, at least. The view up the canyon from this spot has few equals. The view down the canyon is not often excelled. When the day of the Kings River Canyon dawns, it will dawn brilliantly.

We loped and ambled and galloped down this gorgeous valley, filled to the brim with the joy of

its broad forested flats and its soft invigorating air.

The walls were glorious. Those in shadow were clothed in purple, streaked and blotched with yellows and many dark ochers. Large areas were frosted with grays of many shades, some on abutting cliffs shining like silver. The walls in sunlight showed interesting differences. The purples of the shaded side now became dark grays; the light grays, white. The yellows faded or ac-

quired greenish tints. Here and there in broad sunlight appeared splotches of vivid green, probably stains of copper salts.

West of Mount Whitney, through a magic land between it and the eastern boundary of the Sequoia National Park, lies a third valley of great beauty, that of the Kern River. There are those who hold it equal to the Kings Canyon. I do not know; I did not see it. But I confess it photographs as nobly. Be this as it may, of one thing I am certain, and that is that the Greater Sequoia will become, straightway upon realization as a national park, as justly celebrated as any other, and it will naturally follow that a



FITLY NAMED "THE GRAND SENTINEL"

Towering three thousand five hundred feet above the river this peak is one of the features of Kings River Canyon.

goodly amount of tourist travel will be diverted to this section, the wonderful beauty and varied attractions of which I have here attempted to set down but which may only be fully realized and appreciated after personal inspection.

STUDIES OF LEAF AND TREE (PART III)

BY R. W. SHUFELDT, C. M. Z. S.

MEMBER, L'ALLIANCE SCIENTIF., UNIVER. DE FRANCE

IN THE vast majority of instances, botanists, in describing the leaf of our Tulip tree (*Liriodendron tulipifera*), give us practically but one form—the one shown on the upper half of Fig. 36. Charles S. Newhall, the great authority on our trees, says, in describing the leaves of this species, that they are from "three to five inches long and wide; very smooth; with four to six lobes (two lobes at the summit; at the sides two, or two large and two small)."* He says not a word about another very common pattern assumed by the leaf of

beneath; autumn colour yellow"—and thus it goes. No one seems to have described the three-lobed leaf of the tulip tree with but *two sinuses*.

A beautiful flower of this tree is shown on side view in Fig. 35, and a grand tree of this species in Fig. 34. This latter, however, is not typical with respect to its form; for many specimens are to be seen, especially under favorable conditions in the woods, where the long, straight trunk may not have a twig or limb upon it for the first 50 or 60 feet above the ground.



BUD, FLOWER, LEAVES AND FRUIT OF THE TULIP TREE (*Liriodendron tulipifera*)

Fig. 35—An especially fine specimen, showing the advantage of photographing flowers upon side view.

the tulip tree, and here shown in Fig. 36, below. It will be noted that it has but three lobes, a big middle one of elliptical outline, and a smaller one on either side of each, having a rounded end and shorter than the median lobes. Gray, in describing the leaves of this tree, says they are "very smooth, with two lateral lobes near the base, and two at the apex, which appears as if cut off abruptly by a broad shallow notch." And again, Julia Rogers says: "Leaves five to six inches long and wide, three or four lobed with shallow sinuses, apex truncate or concave, base truncate or heart shaped; margins entire, dark green, leathery, smooth, lustrous above, paler

Tulip trees are beautiful at all times of the year and in all situations, and extremely interesting from several points of view. Especially handsome are the terminal twigs when they first begin to leaf out in the spring, with the exquisitely delicate leaves and tender, bursting buds (Fig. 37).

In several parts of Europe, the tulip tree has been carefully reared, it being a great favorite as an ornamental one for lawns. Sometimes it is bred and trimmed, and becomes a fine shade tree, its elegant flowers rendering particularly beautiful the late spring and early summer. With us, no such pains have been taken as a rule, al-

*"The Trees of Northeastern America," p. 68, fig. 52.



"THE SENTINEL," A GRAND SPECIMEN OF THE TULIP TREE (*Liriodendron tulipifera*). THIS SPECIES IS ONE OF THE MOST INTERESTING TREES IN OUR COUNTRY TO STUDY.

Fig. 34—The camera is the most efficient aid to tree study, and an album giving photographs of all the species of trees, from which your leaves have been taken, will form records of the greatest possible value for reference and comparison.

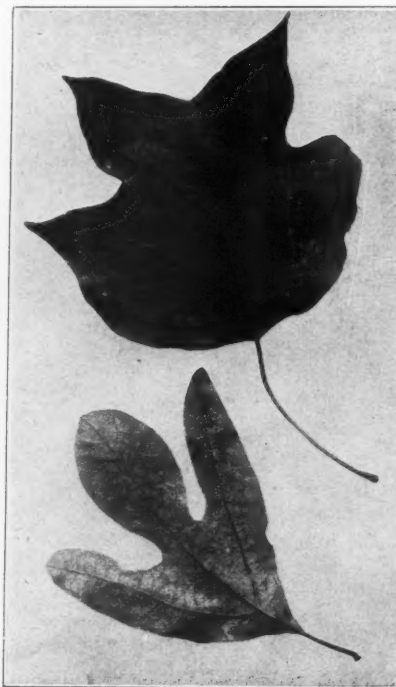
though every opportunity is offered for its cultivation. When we see the tree on private estates in this country, it is generally a leftover from the clearing away of the timber.

Tulip tree wood is used for many purposes, while a tonic drug is extracted from its bark. It is in use by boat builders, and in the factories the pulp is employed for making "postal cards." As with many other woods of the kind, it also furnishes the sort from which shingles are made; also the long handles for brooms. The woodwork of some parts of house decoration is in poplar, as are utensils in the kitchen, especially chopping bowls, in which meat, cabbage, and so on is hashed up.

China has a true tulip tree of the genus *Liriodendron*; but apparent-

ly it has never been carried to other countries for any purpose.

A word in regard to where to draw the line between what constitutes a tree and what a shrub may not be altogether out of place here. Misconceptions often arise from faulty descriptions of botanists, especially in regard to recorded heights. Heights, rather than contour or form, seem to decide in most cases; but then, the heights are often very far from correctly stated. A single example may be chosen by way of illustration for a great many found in botanical text-books. The common Button Bush (*Cephalanthus occidentalis*), Fig. 38, will answer the purpose very well. Newhall speaks of it as "a vigorous shrub about four feet high;" Julia Rogers leaves it out of her "Tree Book" entirely; while Neltje Blanchan refers to it as "a shrub 3 to 12 feet high," and Gray: "Usually a shrub with us, rarely arborescent and five or six meters high,"—that is, over 20 feet high. In this connection it is well to remember that Japanese arboriculturists have produced trees not over ten inches high, especially cer-



LEAVES OF THE TULIP TREE SHOWING THE DIFFERENT PATTERNS THEY ASSUME. FROM THE SAME TREE

Fig. 36—Here is an excellent example to illustrate the necessity for extensive comparison of ample material before finally passing on the question of the limitation of leaf forms.



THIS IS THE WAY THE TULIP TREE BUDS AND SENDS FORTH ITS LEAVES IN THE EARLY DAYS OF SPRING

Fig. 37—This is another useful illustration, to speak a word for the camera in the matter of collecting such photographs; they are valuable from any point of view we may consider them.

tain species related to the conifers. They have all the characters of big trees, only they have been subordinated in the matter of size to the minimum. So there seem to be no hard and fast lines in such matters; we may have shrub-like trees as well as tree-like shrubs.

Be all this as it may, it will in no way affect the various attractions of our Buttonbush, for the fragrance of its beautiful flowers in the spring is simply delightful; and when several of them, in full bloom, are ranged

along the margins of some secluded swamp or sluggish river, few growths of the kind are more attractive.

The Buttonbush has quite an extensive distribution, being found in New Brunswick, from whence it occurs all the way down to Florida—even across the Straits into Cuba. It is also scattered across the United States through Arizona to California. Frequently this globe-flower, river-bush, or button-ball has been brought under cultivation, and to immense advantage; indeed, in some places it has been bred to a point where the flowers and leaves have come to be handsomer than those we find in nature. The study of the great mass of little flowers, each a most perfect structure in its way, would furnish a whole chapter for FORESTRY readers; but for the present, such a task cannot be entered upon. One thing, however, may be said right here to those who are making a collection of our American butterflies: It is well not to overlook the Buttonbush. When it is in full flower, just note how many, many butterflies are attracted by it—and no wonder. The little flowers, so many of them packed conveniently in an easily accessible ball, are absolutely filled with fragrant and delicious nectar—and what more can any roving butterfly ask?

We have a wonderful association of flowers in the Rose family (*Rosaceae*), and here our "natural classification" certainly results in gathering together many apparently very different trees and plants to form one and the same group. As a family, the *Rosaceae* contains, among many other species in its numerous genera, the Goat's Beard; American Ipecac; the Pears, Juneberries, and Hawthorns, with their very numerous allies; the Strawberries; Cinquefoils; Avens and Brambles; Lady's Mantle and the Agrimony; Burnet; all the Roses, and all the Plums, Cherries, and so on (*Prunus*). Think of Agrimony and the wild Cherry trees being in the same family! However, there is no

way out of it, for the flower-structure settles the question in the matter of classification, in as much as it is all on the same plan and arrangement throughout this series.

Among these *Rosaceae*, we have some beautiful cherry trees, both great and small; they all belong in the genus *Prunus*, many of them being well known to foresters, agriculturists, and other readers of this article. One of

the best and most familiar examples is the common Choke Cherry (Fig. 39), which at this time has spread over the greater part of the United States through the agency of birds, various species of which eagerly devour its fruit. In the upper part of the State of Texas and in southern Nebraska, it grows to be quite a tree; while over the rest of its range it rarely exceeds a syringa bush in height. Such a one furnished the beautiful specimen of which the flowers are shown in Fig. 39. This one grew in a little swampy hollow just west of Sixteenth Street, close to the south end of the great bridge spanning an eastern branch of Rock Creek, well within the environs of Washington, D. C. Elegant residences have already encroached upon that locality. As will be noted, its flowers, and later on its fruit, are in pretty racemes. Usually its bark is very shiny, especially that of the twigs—both possessing a very nauseating odor when bruised, or before being so treated—to some extent. Its leaves are well shown in the illustration, and they are noted for being abruptly pointed at their distal ends, their general outline being elliptical,



HERE WE HAVE A BEAUTIFUL SPECIMEN OF THE BUTTON BUSH (*Cephalanthus occidentalis*)

Fig. 38—A well-known writer on American botany aptly likens the flowers of this "shrub" to a little round, white pin cushion, stuck full of pins; the comparison is not so far off.

with edges finely serrated. Choke cherries, even when dead ripe, are by no means pleasant to the taste; and when a kiddie greedily tries them for the first time, it invariably results in his making a most frightful face, blowing them all out of his mouth with a rush, and making a vow never to indulge in them again.

As we proceed westward, *Prunus virginiana* gradually

becomes modified; so that, in the far West, it has come to be recognized as the Western Wild Cherry (*P. demissa*).

Fully as handsome a tree as the Choke Cherry, with blossoms quite as beautiful, is the common Wild Red Cherry or Pin Cherry (*Prunus pennsylvanica*), a tree which may grow to be forty or more feet in height in



DAINTY BLOSSOMS OF THE CHOKY CHERRY

Fig. 39—Nearly everyone is familiar with the common Choke Cherry (*Prunus virginiana*), and many birds feed upon its fruit—sometimes long before it gets a chance to ripen.

a comparatively short space of time, and which dies at the end of a few seasons. (Fig. 40.) Its long-stemmed flowers have white petals, and their structure as a whole is not only striking but singularly beautiful. Indeed, the entire tree is worthy of our admiration,—none the less so when its fruit is ripe, and its every twig simply glistens with thousands of little ruby spheres. What a feast for the cherry-eating birds! It is these very birds who are responsible for the widening of the range of distribution of this species of *Prunus*. Whenever you see a wild cherry-tree, remember that a "pit" has been dropped there by some fruit-loving passerine bird—a robin, maybe—which had swallowed the cherry in another tree, perhaps several miles away. Birds are great forest-planters, too; though very few people realize how useful they are to man in this particular. One of the results of the present war will be a marked increase in the number of wild birds of many different families.

Our elegant maple trees form a family by themselves (*Aceraceae*), with no especially near relatives upon either hand. They are all confined to the single genus *Acer*, though a subdivision takes place in the case of *Negundo*, the Box Elder (*Acer negundo*), the samaras and leaves of which are here shown in Fig. 42. Counting this tree, we have about a dozen different kinds of maples in this country; and they are not only very valuable for their timber, but they stand among the most hardy and reliable of all our ornamental shade trees.

With the exception of the Box Elder, their simple leaves are deciduous, palmately veined, markedly lobed, and opposite (Fig. 41). As to the fruit of the maples, it is paired, being found at the proximal end of the two-winged samara, the stem connecting it with the twigs or branches of the tree being of some length, and attached to a point at the median junction of the seeds. This is



ANOTHER BEAUTIFUL SPECIES OF WILD CHERRY IS THE ONE HERE PRESENTED; THESE ARE TERMINAL BRANCHES OF THE BIRD CHERRY (*Prunus pennsylvanica*), WITH MANY FLOWERS IN FULL BLOOM

Fig. 40—A half century or more ago, when robins, blue birds and cedar birds were far more numerous, these trees used to actually swarm with them as soon as the fruit exhibited any sign of ripening.

well shown in the illustration of the branch of the Silver Maple in the figure last referred to. There is no mistaking a maple after one has examined its leaves and winged fruit; no other tree in any way resembles its composition.

In the Northern Hemisphere alone, nearly seventy

species of these trees are known and described. The more or less inconspicuous red flowers of some of our own species are familiar to every one who has ever noticed the maples lining the streets of his or her native city or town—the Red Maple among others. A big army of honeybees get after the feast as soon as the warm spring days bring them out. In less than a week these flowers are in masses, and the effect is enhanced by the gradual appearance of the new leaves, which are also of a brilliant red color. This Red Maple (*Acer rubrum*) is one of the best known of any of this group; but it does best, however, down in the swampy lands, where its scarlet budding in early March largely contributes to the glory of the opening year.

Our Silver Maple, or Soft Maple as it is sometimes called (*Acer saccharinum*), is a superb representative of the family, but it must have plenty of room to spread in. Then, too, examples are frequently met with that have grown to be at least a hundred and twenty or thirty feet



BOX ELDER (*Acer negundo*). ALTHOUGH IT HAS "KEYS" LIKE THE MAPLES, THEY ARE ARRANGED IN DROOPING RACEMES, AND THE LEAVES ARE QUITE DIFFERENT

Fig. 42—When the Box Elder is of good size, perfect in form and foliage, with hundreds of strings of these beautiful little "keys" swinging from its branches, it is certainly a very charming addition to the woods in spring and early summer.

in height, with a big, horizontal spread, especially of the upper third of the tree. Its limbs are slender and lengthy, with the terminal twigs inclined to droop. As its scientific name indicates, its sap is sweet to the taste.

This species has a general distribution over the eastern half of the United States and Canada; and its wood is useful for some purposes—flooring, among other things. Its sap, by boiling, makes a pretty good kind of sugar; but it is only occasionally that it is used for that purpose. Silver Maples are planted in a great many places for their shade, and as such they have met with considerable favor. We have some very valuable trees of this family, as the Sugar Maple (*A. saccharum*); the Broad-leaved Maple of the West (*A. macrophyllum*); the Black Maple (*A. nigrum*)—a fine tree for its sap—and a number of others. Lack of space prevents giving any descriptions of these; moreover, it is quite likely that a number of them have already

been described in earlier issues of AMERICAN FORESTRY by writers familiar with all their values and characteristics. Then, too, mere descriptions, without excellent photographs of the subjects, their leaves, fruit, and so on, do not go very far.

Our maples are more or less nearly related to a number of other groups of trees in this country; among these we may mention those constituting the family *Sapindaceae*, which contains the horsechestnuts or buckeyes (*Aesculus*). There are five species of these trees commonly recognized, four being of eastern distribution and one in California (*S. californica*). Gray associates the Soapberries (*Sapindus*) with the horsechestnuts, and recognizes one species for the eastern districts (*S. drummondii*). Several varieties of horsechestnuts or buckeyes are recognized, but they need not concern us here.

Buckeyes or horsechestnuts may readily be identified by their leaflets being all bunched together at the extremity of the leaf stem; by the erect, pyramidal and conspicuous



UPPER FIGURE, ARRANGEMENT OF LEAVES IN THE BIG SHELL-BARK HICKORY OR KING NUT; LOWER ONE, A LEAF OF THE TULIP TREE (*L. tulipifera*)

Fig. 44—In the fall, the dried leaves of the Shell-bark Hickory are very beautiful objects, when perfect, seven leaflets are found on the stem; they are of a rich tan color and beautifully curled up.



WE HAVE A VERY HANDSOME TREE IN THE OHIO BUCKEYE (*Aesculus glabra*), THOUGH A DESPISED ONE ON ACCOUNT OF THE UNPLEASANT ODOR GIVEN OFF BY ITS BARK

Fig. 43—Apart from the offensive odor here referred to, however, this tree, when in full flower, is a most ornamental one, and often quite as shapely and striking as the common horse chestnut.

racemes of showy flowers; big winter buds, and by the character of their fruit, which consists of large and handsome nuts held in leathery husks, which are usually three-valved. Both nuts and bark of any of these trees are peculiarly bitter and disagreeable to the taste.

As in the case of some of its relatives, the trees of the horsechestnut family have their leaves springing from opposite points on the twigs—an arrangement which is equally true of the maples, the box elder, dogwoods, all the members of the ash family, including the fringe tree (Figs. 46 and 47); the viburnums and the catalpas. In the ashes and elders we have compound leaves,—that is, to sum up, the horsechestnuts, the elders, and the ashes all have opposite and compound leaves.

By glancing at the leaves of the Ohio buckeye in Fig. 43, it will be observed that they are *palmately compound*, while in the ash tree they are *pinnately compound*.

It is interesting to know the origin of such names as "horsechestnut" and "buckeye," which have for so long been applied to these trees. Some seem to think that the word "horse" has been applied to the tree for the reason that its fruit is not fit for human food; but this does not seem to be a very reasonable explanation. More to the point would it be to say that the word "horse" has for ages past been applied to anything that was coarse or ungainly, or even large—as "horse laugh," "horse play," "horse god-mother," and so on. Then, too, horsechestnuts were ground up for horse food. "Buckeye," on the other hand, doubtless came from the fancied resemblance of the nut to the eye of a deer; but as it is of a deep chestnut color, with a light tan center, the comparison is rather far-fetched. However this may be, the word "buckeye" has very evidently come to stay; we have the "Buckeye State," Ohio being so named on account of the former abundance in it of the Fetid or Ohio Buckeye (*Æsculus glabra*). At this writing it is more abundant farther west, for the reason that it was cut down wherever homes and villages appeared owing to its very disagreeable, really foetid odor; so that now it is practically a rare tree—in Ohio at least.

Instead of being white or pale cream, as in the common horsechestnut, flowers of the Ohio buckeye are a pale, yellowish green, and are here well shown in Fig. 43. That beautiful raceme was taken from a superb specimen of this species of horsechestnut which flourishes on a small branch of Rock Creek (Kling Road), very near the north gate of the National Zoological Park at Washington, D. C. Its beautiful, white wood, which is split with the greatest difficulty, appears to be used only in the making of artificial limbs, while other horsechestnut trees furnish us with other things. The Big Buckeye

(*Æ. octandra*) has a nut from which a paste is made for bookbinders, which not only is a very good "stick-er," but so disagreeable to bookworms that the insect will not feed upon it, as they do in the case of some other pastes. Many of the horsechestnuts are used as shade and ornamental trees, especially the common species (*Æ. hippocastanum*).

Of all the tree families in this country, and of all those as yet not touched upon in the foregoing paragraphs of the present series of articles, no small family can compare, in the matter of importance, with the Walnut family (*Juglandaceae*). This includes the trees of the genus *Juglans*, the Walnuts, and *Carya*, the Hickories. We have several species of walnut trees in the country, and most people are familiar with them. There is the Butternut (*J. cinerea*), also called the white walnut by some; the Black Walnut (*J. nigra*); the Walnut of



A BIG SHELL-BARK HICKORY (*Carya laciniosa*) COMING TO LIFE IN THE SPRING. ITS LEAVES ARE JUST EMERGING FROM ITS ENORMOUS BUDS

Fig. 45—This is one of the finest sights in all nature when spring first opens up; it is worthy of the closest study and observation.

Mexico (*J. rupprestris*), which may also be seen growing in the canyons of lower Arizona and that region; the California Walnut (*J. californica*) of the Pacific coast, being restricted to certain parts of California. Finally, that prince of all nuts, the English or Persian Walnut (*Juglans regia*), which has been successfully introduced into some parts of this country—more particularly into California. These are all trees of great commercial value, but more for their nuts and their wood than for ornamental shade trees, though not a few of them fill this place most admirably. The Black walnut, for example, is a royal tree for parks, and possesses many other good qualities. Unfortunately it is becoming very scarce, and we have taken but scant pains to cultivate it. Cords



FRINGE TREE, AN UNUSUALLY HANDSOME SHRUB THAT MANY KNOW AS "OLD MAN'S BEARD" (*Chionanthus virginica*)

Fig. 40—This is a southern Maryland specimen from the bold, rocky cliffs at Great Falls of the Potomac; it is found growing there most luxuriantly, offering a very conspicuous object among the imposing rocky banks of the river.

of it have been used up for gunstocks alone, and household furniture has likewise demanded a fearful toll. But a full history of the walnut trees, botanical and commercial, would furnish ample material for a small volume; so they must be set aside for the present, in that a few words may be said about the hickories.

There are a dozen species of these and all confined to North America. It was Rafinesque who, in 1808, placed them all in the genus *Scoria*. In 1817 he changed this name to *Hicorius*, and, finally, in 1836, to *Hicoria*. Nuttall changed the last to *Carya*, which is the one accepted by Gray, and is said to be an ancient name for the walnut. It is also said that every one of our species may be found growing in nature in the State of Arkansas, which is an exceptionally fine region in which to study and compare all the members of the group.

No tree history is

more interesting than that of the hickories; it is filled with romance, legend, and tradition for the various products of these trees have been used long before the white man ever came to this country. In Europe these hickory trees are found fossil in the Tertiary, and all efforts to rear the existing types have failed there. Julia Rogers says: "No group of trees has higher qualities than the hickories. The wood of most species is tough, strong and flexible—especially valuable for farm implements, tool handles, and the like. There is no other fuel that excels dry hickory for heat and brilliancy of flame. No other of our trees bear such valuable nuts. No finer tribe of shade and ornamental trees is to be found. With all their positive good qualities, the hickories have scarcely a bad one."

The upper cut of Fig. 44 shows the arrangement of the leaves in the Big Shellbark Hickory (*C. laciniosa*), there being but five on the stem in the Pig-nut hickory (*C. glabra*); still other species have seven. The study of hickory nuts is a very long chapter, only equaling what could be written about the uses to which the wood of the hickories is put in this country. It has not its like for a great many uses. Hickory nuts and hickory oil cut another big figure commercially; while of recent years considerable attention has been paid to the hybrids of the hickories, and still more to the question of improving some of the species through grafting. Much success has followed upon experiments in the last field, particularly in selective grafting in the case of the pig-nut.

The Pecan also belongs in this group; and, although its wood is of little value to man, the nuts are of very great commercial value. Many a man in the South has become more than wealthy through devoting his attention to their cultivation and subsequent marketing.

There are some beautiful trees and shrubs in our Olive family (*Oleaceae*), for the group holds all the Ashes (*Fraxinus*), the Lilacs (*Syringa*), Swamp Privet (*Adelia*), the common Privet (*Ligustum*), and the lovely Fringetree (*Chionanthus virginica*), also called "Old Man's Beard," a name which is applied, too, to our well-known Clematis vine.

The Fringe tree has



A PRETTY BUNCH OF THE FLOWERS OF THE FRINGE TREE (*Chionanthus virginica*), A FINE SPECIMEN OF WHICH IS GIVEN IN FIG. 40.

Fig. 47—This is a very difficult subject for the camera, as the slightest movement of the air will cause the delicate petals to tremble.



"KEYS" AND LEAVES OF THE SILVER MAPLE (*Acer saccharinum*), OFTEN CULTIVATED AS A SHADE TREE IN OUR TOWNS AND CITIES

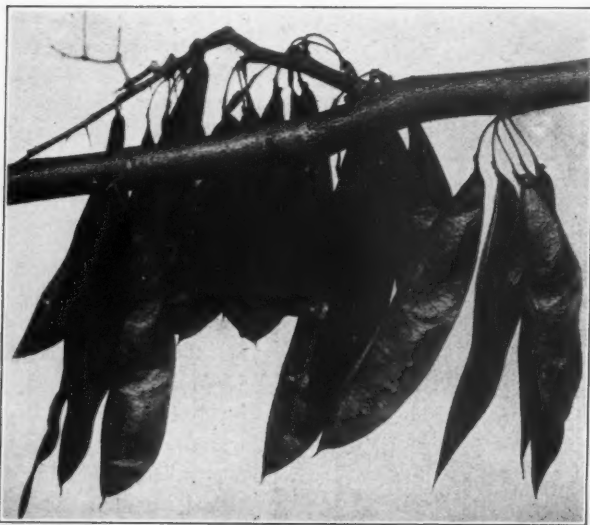
Fig. 41—These structures go a long way towards making correct identifications of our maples, and should always be collected with the leaves for the herbarium.



JUDAS TREES SOMETIMES HAVE THE FORM OF A SHRUB. THIS ONE IS IN FULL BLOOM LATE IN MARCH IN WASHINGTON. THE LEAVES HAVE NOT STARTED, WHILE IT PRESENTS A PERFECT BLAZE OF PINK FLOWERS

Fig. 49—Note the famous old red cedar standing close to it. These trees are well known to hundreds of ramblers who live at the Nation's Capital.

such a striking appearance in the woods, and has been so long under cultivation as an ornamental tree or shrub, that it is well known to a great many people in the country where it flourishes. Translated, its Greek name means snow-blossom, which it well deserves, as



WHEN PEA-FLOWERS FRUIT, WE MOST NATURALLY HAVE PEA PODS, AND HERE THEY ARE FOR THE RED BUD OR JUDAS TREE. YOU WILL FIND THEM DESCRIBED IN THE TEXT

Fig. 51—These pods are of a rich bronzy brown color, and the merest jar of the limb causes them to lose their hold and fall to the ground.

may be appreciated by glancing at Figures 46 and 47. From the southern part of Pennsylvania it is pretty well distributed over the eastern part of the United States as far as Texas, including the Gulf States. The specimens here shown are from Great Falls, Md., on the Potomac, a few miles west of Washington. There they grow high up on the rocky cliffs and gorges, among various other trees of the locality, especially oaks, cedars, and spruce. From the United States it has been introduced into various parts of Europe, where it is known as a beautiful exotic from this country, and highly prized as an ornamental tree. Its flowers possess a most delightful fragrance; and, indeed, as one of our smaller trees, there is not one in the country that can rival its dainty flowers, exquisite leaves, and striking appearance. Later in the



IN THIS PICTURE WE HAVE A CLOSE VIEW OF THE JUDAS TREE FLOWERS AS THEY APPEAR ON THE LIMBS, BRANCHES, AND TWIGS OF THE TREE; THEY ARE TRUE PEA BLOSSOMS

Fig. 50—The leaves do not appear until later; when they do, they are seen to be rather large and of a distinctly heart-shaped outline.

year it bears a beautiful fruit, which is of a bluish color—scarcely less handsome than the tree's blossoms in the spring. China also has a Fringe tree; but it is said that it is in no way as graceful and dainty as our American one. The specimen shown in Fig. 46 is about twenty-five feet high.

We cultivate another very handsome tree in this country—the Judas tree, sometimes called the Red-bud (*Cercis canadensis*) (Figs. 48-51.) It is a representative of the

Pulse family, which is a very large one. Nearly all of them bear *pea blossoms*, such as the Clovers, the Locust trees, beans, and others altogether too numerous to mention. They are *podbearers*, and the Locusts and Red-buds are the principal trees among them in this country.

Cercis is also represented in Europe and Asia, some seven or eight species having been described. We also have a Texan species (*C. texensis*) that sometimes grows to be quite a tree, thirty-five or forty feet in height. The northern tree is distributed pretty well over the United States, and seems to prefer high and dry situations. It is one of the most elegant bloomers of early spring. One day its dark twigs and branches attract no special attention, when, all of a sudden, they are more or less densely covered with beautiful pink or pinkish-magenta blossoms, swinging on little delicate stems. (Fig. 50.) At this

stage they may be seen for a long distance through the woods, or easily recognized in the open (Fig. 49). After a while, the leaves come; they are rather large and heart-shaped—then, indeed, is the tree a beauty, and it is no wonder that it has been used as an ornamental one in hundreds of instances, being both hardy and handsome. When the flowers go to seed, its pods grow to be of considerable proportions; they are flat and pretty thin, averaging about three inches in length and one in width. There is a single row of very light-brown seeds in each. The hold of these pods upon the limb from which they hang is very slight, so that a mere breath is sufficient to have them fall to the ground. An especially fine group is here shown in Fig. 51. Imagine these to be a sort of bronzy brown, and you will have the real thing before you.

A TREE GUESSING CONTEST

BY J. S. HOLMES

SECRETARY OF THE NORTH CAROLINA FORESTRY ASSOCIATION

ONE of the most important and often one of the most difficult parts of State Forestry work is interesting the children of the schools in the trees and forests which they see around them; for only by laying such foundations can a permanent State forest policy be secured.

At the recent annual meeting of the North Carolina Forestry Association in Wilmington, the most successful forestry lesson for children probably ever held in this State was given. Six hundred children gathered in the Hemenway School Auditorium to take part in a guessing contest inaugurated by the Association, but worked up by the Principal and teachers of the city schools. The children were supplied with a list of 16 common North Carolina trees, a blank sheet of paper ruled and numbered one to sixteen, with lines at the bottom for the name, grade and school of the child.

Lantern slides, illustrating the form and characteristics of each tree were shown. These were supplemented by information concerning the distribution, habits and uses of the different trees given by the State Forester. After each tree had been shown, the lights were turned on for a moment so that the children could write down the name of the tree on their paper. After all the trees had been shown, two motion picture reels, loaned by the Forest Service, the one showing forest fires and the other lumbering lodgepole pine, were shown, while a number of the teachers went over and marked the papers.

Four children guessed all sixteen trees correctly. These had to draw for the first four prizes, which were as follows: First, Coker & Totten's "Trees of North Carolina" and \$1.00 in cash; second, Coker & Totten's "Trees of North Carolina" and 50 cents in cash; third, Coker & Totten's "Trees of North Carolina," and fourth, 75 cents in cash. Four children got fifteen trees right and each got 50 cents in cash. The ninth prize was also 50

cents, while the tenth to sixteenth were 25 cents in cash each. Six children got fourteen right and two got thirteen right, so that there was no need for deciding priority by lot. The prizes were offered by the Association.

The entertainment, which included the reading and endorsement of the resolutions proposed by the Association at its afternoon meeting, lasted for more than two hours, yet the interest of the children was sustained at the highest pitch throughout. The Wilmington paper said: "It was hard for them to keep quiet, so enthusiastic were they over the contest that gave so much interest to the event." The Principal has since written as follows: "I want to thank you for the very delightful evening which you gave the children on the occasion of the meeting here last Friday evening. The children who won the prizes are real heroes in town. Please send me the correct list of trees as you showed them on the screen, as I want to place the correct list in every school. Everybody is talking trees now. We all enjoyed greatly your visit and I want you to feel that you have made friends for Forest Conservation of hundreds of children here in the City."

Such a success could not possibly have been achieved without the hearty co-operation of the school authorities. The teachers in the various schools kept the matter before the children for a week or two before the contest, by drawing the different parts of the various trees in the list on the black board and by telling the children about the trees. Every book about trees in the Library had been called for by the children, and nothing had been neglected which would add to the success of the occasion. Contests along this or similar lines might be arranged in other schools where such hearty co-operation could be secured.

THE HUMMING-BIRDS AND SWIFTS

(Families Trochilidae and Micropodidae)

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THE smallest bird in the world is a humming-bird. It measures two and a quarter inches from the tip of its bill to the tip of its tail and weighs but a fraction of an ounce. It is called "The Fairy Humming-bird" and is found in Cuba. All humming-birds, however, are not so small. Indeed, the giant humming-bird, inhabiting the higher peaks of the Andes, is over eight inches long and resembles a swallow. The majority of the 580 species and subspecies, however, are tiny birds under four inches in length.

In addition to their small size, humming-birds are noted for the brilliancy of their colors. "Glittering fragments of the rainbow," Audubon has called them, and, indeed, each hue of the rainbow, from the most delicate blues and greens to the most vivid reds and purples, can be found on some species. Sometimes the extremes of color, in wonderful combination, are found on the back or breast of a single bird. The colors are not real pigment, however, but are caused by the refraction of light due to the structure of the feather and appear brilliant only by reflected light. Thus even the brightest members of the family appear sombre in many lights and as they flit from flower to

flower, they alternately flash and fade. Many species are curiously ornamented with elongated tufts of feathers about the head or breast. Other species have greatly elongated tail feathers four or five times the length of the bird, and these are some times enlarged at the end or racquet-shaped. Still others have dainty little pantalets of fluffy white feathers about the legs.

In spite of their great variety and the abundance and the wide range of some species, humming-birds are found only in the New World. They undoubtedly originated in the Andes of Colombia or Ecuador where the

majority of species are still found, but some have spread as far as Patagonia and others as far as Alaska. They have never reached either Europe or Asia, however, and numerous attempts to introduce them have failed. The majority of species are quite local in their range, some being restricted even to a single mountain top or to a single valley. Again, although they are found all over North and South America, they are very poorly represented in some regions. Thus, while 18 species have been found in the United States, only one species, the

ruby-throated humming-bird, occurs east of the Mississippi River. Some species live in the dark humid forest, others in the arid deserts, but the great majority spend their lives in the sunlit tree tops or about clearings in the forest wherever there are flowers.

It is from the nectar of the flowers and the tiny insects lurking in the corollas that most species derive their sustenance. A few pick insects from beneath the leaves and a few others dart out after passing insects as do the flycatchers, but these are exceptions. Indeed, so dependent are they upon flowers that the bills of many species have become adapted to particular flowers. In all species the bill is probe-like and the tongue tubular

for sucking the nectar, but in certain ones the bill has become very much decurved, even sickle-shape, and in others even upcurved to help them in getting the nectar from flowers having pouchlike or liplike corollas. One species has a bill nearly five inches long and another a bill that measures scarcely quarter of an inch. Curiously enough the two species feed at the same long tubular flowers, the one taking the nectar in the legitimate way, the other evading nature's provision for the pollenization of the flowers, by drilling a hole through the base of the corolla into the nectary, for it is upon the



Photograph by A. D. DuBois

THE RUFOUS HUMMING-BIRD FEEDING ITS YOUNG

Young hummers are fed upon the nectar of flowers and tiny insects which are injected into their throats by the probe-like bill of the mother-bird. Here the undeveloped, swift-like bill of the newly hatched young can be seen. Rufous humming-birds are found in the West from California to Alaska.

humming-birds that many of these flowers depend for cross-fertilization, the head or the bill of the bird carrying pollen from one flower to the next.



HALF GROWN HUMMERS

When humming birds are first hatched the bills are very short but they rapidly elongate, as is shown here, until when the birds are ready to leave the nest, they are nearly full length.

Even as remarkable as their size, their brilliant colors, or their curious modifications, are the nesting habits of the humming-birds. The nests are skillfully constructed



LAST CALL FOR DINNER

The mother Rubythroat has just arrived with her crop full of hummingbird delicacies, and the young ones are eagerly waiting

of plant down or wool, gathered from ferns or catkins, and fastened together and bound to the branch by spider

webs. The outside of the nest is ornamented usually with lichens or bits of moss so that it simulates a knot or resembles the branch upon which it is placed. Usually the nest is saddled upon a branch but with some species it is regularly fastened to the underside of the large leaf of a palm or a tree-fern, or even to a projecting cliff or an overhanging rock. Invariably but two eggs are laid and these are always pure white without spots. They are about the size of beans, though sometimes smaller, and always more slender.

Humming-birds derive their name from the buzzing of their tiny wings, for their voices are seldom heard. During the courting season, however, most species give vent to their feelings with excited chipperings as they swing, with flashing wings, back and forth past the female. A few species have songs of surprising volume and melody which they sing, as do other birds from an exposed perch on the top of a bush or tree.



NO WASTE IN THIS FAMILY

The mother humming-bird makes sure that no food will be wasted by inserting her bill far down into the throat of the young bird.

By far the best known species of humming-bird is the ruby-throated, found in summer throughout eastern United States and Canada as far west as Texas. The male bird is bright emerald green above and grayish below with a patch of brilliant ruby-red feathers on the throat that are lacking in the female. Unless the light strikes the feathers at just the right angle, both the red and the green appear dark so that when the little bird is at rest, it is usually passed unnoticed. Indeed one is led to believe that they spend their entire lives on the wing because they are so seldom seen when resting.

Rubythroats appear from the south, where they have been wintering from Southern Florida to Panama, about the first of May when the leaves are just beginning to unroll and the first blossoms of the cherry and the flow-

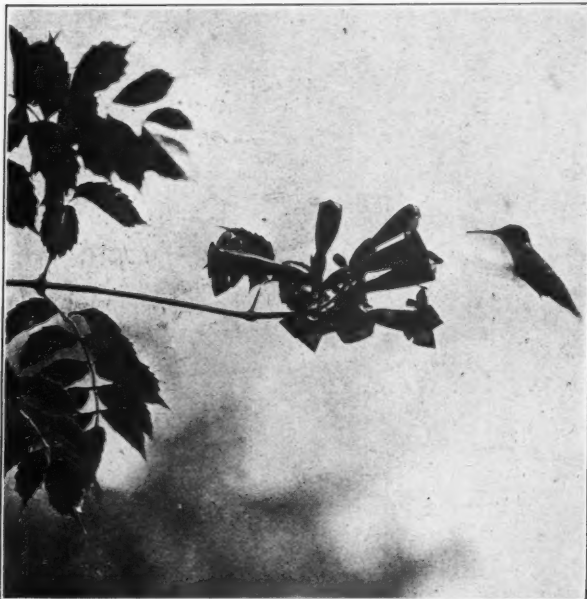
ering quince are beginning to open. From that time to the middle or the last week of May, the flowering trees sometimes buzz with their wings, for although they are not at all gregarious, a tree like a horse-chestnut at the height of its season may attract them in great numbers.

About the last of May, nesting begins and the dainty little cottony structure is saddled on the branch of an apple or other tree from 15 to 25 feet from the ground. The outside is covered with lichens which makes it very difficult to discover. Indeed were it not for the alarm of the mother bird and the intrepid way in which she darts at one's head when in the vicinity of the nest, it would seldom be found. No bird or animal is allowed to approach within a certain radius of the nest without being attacked. Be it one of its own kind or one of the largest hawks, it is pursued with the same courage.

The male is at first quite attentive but after the eggs are laid he disappears and never assists in the incubation

is particularly fond of red flowers and if a person wears bright colors in the field, they often flash up to examine them.

Watching the chimney swifts as they dart back and



PLANT TRUMPET CREEPERS AND HAVE HUMMING BIRDS

Their tiny wings move so fast that they make a humming sound, and the camera scarcely shows them.

or care of the young. Neglecting his responsibilities he selects some favored locality where there are flowers and when not making the rounds, sits quietly on a dead branch or telegraph wire preening his feathers.

The eggs hatch after two weeks of care and the young remain in the nest for about three weeks. When first hatched, they are blind and naked and their bills are very short. It is at this stage that one can more easily recognize their relationship to the swifts that are so very different in adult life.

Of the 17 other species of humming-birds reaching the United States, only seven advance beyond the states bordering Mexico. The best known of these is the rufous humming-bird, found in summer from California to Alaska, especially in the mountains. It is reddish brown in color, the male having a fiery red throat patch that gleams orange and yellowish green in some lights. It



A SUSPENDED CRADLE

This South American humming-bird chose a beautiful location for his nest, hanging it on the under side of a front of a tree fern and decorating the outside with bits of moss. These birds are confined to the New World, and are found in greatest numbers in Colombia and Ecuador.

forth over the house tops, or circle in dark clouds before descending some disused chimney, one never suspects their relationship to the humming-bird. Even close in-



JUST FROM THE NEST

A blade of timothy suffices to support the weight of this tiny fledgling,—a dainty ruby-throated humming-bird.

spection fails to reveal much similarity except in the shape of the long narrow wings and the tiny feet. Never-

theless, the kinship exists and much of their internal structure is very similar. As already intimated, if one examines the newly hatched humming-birds with their tiny bills and large mouths, or the large dull-colored giant hummer of the Andes, the relationship is better understood.

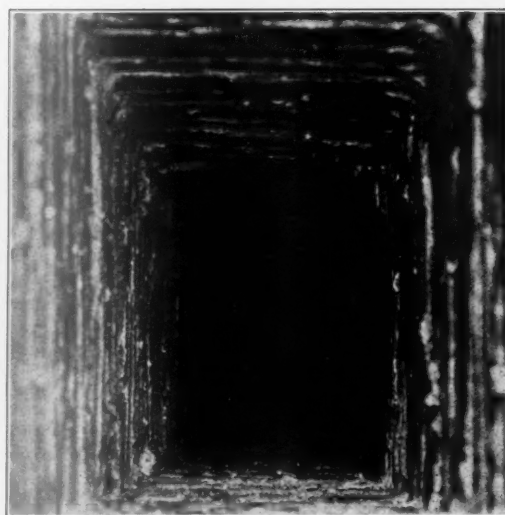
There are nearly 100 species of swifts, of which about a third are found in the New World. Of these but four occur in the United States and Canada, and only one, the chimney swift, is ever found east of the Rocky Moun-

tains. This bird is commonly called the chimney swallow and indeed it resembles a swallow much more than it does a humming-bird, although there is no real relationship between the two, the swallows being but modified passerine or perching birds, while the swifts and the humming-



LOOKING DOWN A CHIMNEY

The fragile nest of the chimney swift with its three pure white eggs is fastened to the side,—fifteen feet from the top.



HAPPY HOUSEKEEPERS—CONJUGAL BLISS IN A CHIMNEY

The two chimney swifts are sitting on the nest side by side, their heads close together. Since they are just the color of the soot in the chimney, it is a difficult subject for the camera.

birds form a very different order.

With few exceptions, swifts are sooty black birds of rather short harsh plumage, sometimes with white on the rump or underparts, but often with no marks whatever. The chimney swift, for example, is entirely sooty and but little lighter below than above. The East Indian tree swifts are exceptions in which the plumage has a metallic gloss and the feathers are quite silky.

The most interesting thing about the swifts is their method of nesting. The nests are built of sticks, straws, feathers or other material in the form of a shallow saucer, cemented together and to the wall of the cave, hollow tree, or chimney, by means of the birds' saliva which is specialized into a peculiar glue. In one group of swifts inhabiting the islands off the east coast of Asia, the nests are made entirely of this saliva. It is from these nests that the



CROWDED FROM THE NEST

Chimney swifts lay but three eggs, but the nest is so small that the young soon outgrow it and have to climb out and cling to the wall, propping themselves with their tails, as do the woodpeckers.

famous "birds' nest soup" is made, and the birds themselves are called the "esculent swifts." They nest in large colonies in caves and the gathering of the nests is an organized industry. The nests weigh about half an ounce and bring as high as \$7 a pound and, although they have been gathered from some caves for over 200 years, there seems to be no diminution in the number of the birds.

The nest of the chimney swift is built of short twigs which the birds break from the tops of dead trees either with their bills or feet as they swoop past without stopping. An area in the chimney or silo, as shown in the illustration, is first coated with the viscid saliva so that sticks will adhere to it. Others are then added and coated with the peculiar glue until a little saucer is constructed strong enough to support the weight of the bird, or even both birds, for they sometimes sit on the nest side by side. The nest is

so small, however, that the young outgrow it long before they can fly and they have to climb out and cling to the wall as do the old birds, propping themselves up with their tails. The tail feathers are stiff and tipped with spines, somewhat similar to the woodpeckers, except there are no barbs at the tip and merely the shafts protrude. Swifts never perch or descend to the ground as do other birds.

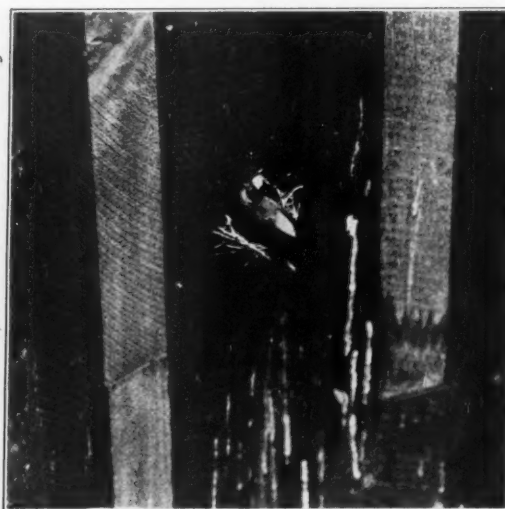
Chimney swifts return from the south about the middle of April but where they have spent the winter is still



A NEW DEPARTURE

From nesting in hollow trees, the swifts adapted themselves to chimneys and now—the more modern silo attracts them. Here the swift is clinging to the wall near the nest.

a mystery, for the chimney swift is the one bird in Eastern North America whose winter quarters have not yet been discovered. It is known that they go as far as Vera Cruz and it is probable that they winter somewhere in Central America or Northern South America, but it is



A SCOTCH MOTHER

Apparently the swifts despise comfort, for their shallow nests of angular twigs are never lined and are so small that the bird has to incubate in the awkward position here shown.

impossible to distinguish them from the native swifts as they soar high overhead and as yet none have been collected. They are common in all parts of the East until late September or October, when they suddenly disappear. Just before this time and when they first appear in the spring, they sometimes occur in flocks of thousands and at dusk are seen circling about some tall chimney before settling to roost. For a time, as they pitch headlong into the chimney and again as they rise in the morning, so numerous are they that they look like smoke rising for several minutes. At other times of the year they scatter and it is doubtful if more than one pair ever nest in a single chimney, although pairs from adjacent chimneys often fly in company and from the fact that they are often seen in trios, it has been suggested that they are polygamous. There is as yet, however, nothing further to support this belief. Sometimes they sail with the wings held high over the back but more often they

fly with apparent alternate strokes of the wings and gain such momentum that few if any birds fly faster. Thus they circle back and forth through the hordes of midges and mosquitoes, probably with their mouths open, for they never seem to pursue any particular insect as do the swallows.

The three swifts found from the Rocky Mountains to the Pacific are called the black swift, vaux swift and the white-throated swift, the last being considerably larger than the others and having the throat and breast white. A most interesting discovery has recently been made in connection with the black swift in that it frequently remains dormant for days at a time in the crevices of the rocks when the weather is cold and wet, in a sort of hibernation, a most unusual circumstance among birds which ordinarily require a constant supply of food to maintain life.

CONSTANCE is 194 years old. Constance has seen ten Danish kings come and go. Constance is a Danish sailing vessel made of wood and will soon celebrate her 200th anniversary of service. The Danish sailing fleet, despite the ravages of the submarine, still has 16 wooden vessels each more than 100 years old. These vessels average 414 registered tons. In March, 1916, there were only four of these vessels more than 1,000 tons, but purchases abroad since that time have now increased the number of wooden vessels to 25 which are over 1,000 tons.

STANLEY R. AUGSPURGER and Roy Muncaster, of the United States Forest Service, gave their lives for their country in the Tuscania disaster. During last year Augspurger was employed as a field assistant in timber surveys in District 6. His home was in Dayton, Ohio. Muncaster was formerly a ranger on the Olympic Forest. E. E. Harpham, formerly a scaler on the Olympic, was rescued.

THE Twentieth Engineers (Forest) has completed recruiting and no additional men are needed.

HOW THE FOREST SERVICE HAS HELPED THE STOCKMEN

BY ALBERT F. POTTER

ASSOCIATE FORESTER OF THE UNITED STATES

THE ONE thing which stands out more clearly than any other as an accomplishment in the management of grazing within the National Forests is that the ranges are producing more and better stock than they did before and the stockmen using them are making more money than those who are using the outside uncontrolled ranges. The most important result of this is that the National Forest ranges are not only continuing to furnish their share of the beef and mutton necessary to keep up the country's food supply, but are gradually producing an increased amount of these food products. And furthermore this is being done now with the almost unanimous support and endorsement of the stockmen as compared with their most critical opposition in past years. How this change has been brought about is not difficult to explain, because it is simply the working out of a constructive plan which has carefully guarded against any unnecessary curtailment of the livestock industry and has encouraged the fullest possible use of the National Forest ranges consistent with good forest management.

In the beginning and before the Forest Service took charge of the National Forests, the attitude of the government tended to favor the exclusion of livestock, par-

ticularly of sheep and goats, from these ranges, and to consider grazing as something which must ultimately be done away with if the forests were to be permanently maintained. It was believed by many that when the range had been denuded and injured by overgrazing there must be a total exclusion of livestock before any improve-

ment in the condition of the range could be secured, or particularly before these lands could be successfully reforested. The great importance of the livestock industry, however, required that every possible effort be made to provide for a continuation of grazing upon these lands in order that serious business disturbance might be avoided. Therefore, right in the beginning of its administration the Forest Service undertook to work out a system by which the condition of these lands could be improved while they were in use for grazing purposes.

Early studies

of the causes which had led to deterioration in condition and decrease in carrying capacity of the ranges showed that in many instances the damage was due mainly to the manner in which the stock had been handled. Much damage had resulted from placing stock on the summer ranges too early in the season, before the forage had made a sufficient growth to be ready for grazing. Also



ON THE ROAD TO MARKET

Through regulated use of the range on the National Forests it has been possible to greatly increase production and improve general conditions, minimizing loss from all causes; and the stockmen are cooperating fully with the Service as well as working independently along the same lines.

in the rush of each stockman to get to these feeding grounds early and ahead of any of his competitors, serious damage had resulted from trampling out the grasses and plants. This was not to be wondered at because in the absence of any authoritative system of control, about the only way in which a stockman could secure and hold these early ranges was by getting his stock to them first and grazing off the forage before some one else did so. Without restriction of any kind there was of course also a number of stock on many of the ranges which was greatly in excess of the carrying capacity of the lands and the forage grasses and plants were being destroyed by overgrazing. Exercise of the authority conferred upon the Secretary in charge of the Forests to issue and enforce rules and regulations governing the use of the lands included within the National Forests was all that was needed to correct those evils and bring about an improvement on these ranges included within the Forests.

The application of the very first principles of regulated grazing, which are to fix the number of stock that may be grazed upon a given area and to deter-

mine when the stock shall enter and leave it, brought about a saving of fully 30 per cent of the forage because this proportion had been wasted by lack of system and control. Where the ranges were overcrowded it was clear that unless this condition could be relieved by transfer of stock to other ranges which were not being fully used, it would be necessary to reduce the number of stock. To do this often required the construction of trails and bridges, and the stockmen willingly cooperated with the Forest officers in doing the necessary work. By this means not only were many reductions obviated but the stockmen were encouraged to extend the work and open up other new ranges so that a larger number of stock might be grazed upon the Forest ranges. The area available for grazing was also extended in localities where the range was unused because of the absence of stock watering facilities by clearing out seeps and springs and piping the water into troughs, by the construction of storage reservoirs, by building trails into watered canyons, and often by piping the water for

many miles out into the dry portions of the range. The water development work has not stopped at opening ranges which had been unused before but has been the means of improving conditions on many of the used ranges by lessening the distances which stock had to travel to reach water, in this way making it possible to produce not only more, but better and heavier stock upon the same range.

The profits of a business often depend upon the possibility of stopping the leaks. In raising cattle and horses upon the public range many of the leaks were due to the lack of any authority under which the fences needed for control of the stock might be constructed; in fact, fencing of the public grazing lands was prohibited by law. This problem was solved on the lands included

within the National Forests, through the authority of the Secretary of Agriculture to protect and regulate the use of the lands and not only have many hundred miles of drift and division fences been built, but a very large number of pastures have been constructed for use in gathering beef steers, handling graded stock, holding saddle



AT HOME IN THE MOUNTAINS

Not only more, but better and heavier stock may be produced through improved range conditions by lessening distances to water for stock and other means of range development.

horses, and furnishing nearby range for milch and work animals. Some of this work has been done by the stockmen entirely at their own expense, some in cooperation with the Forest Service, and some by the Forest Service alone. This means that the losses from straying and theft have been reduced, the calf crops and brandings increased, and the grade of stock improved. It means also that the losses from poisonous plants have been reduced through fencing the poison areas. The result is that on the National Forest range the leaks which were due to lack of legal authority and control have been stopped and the stockmen are raising more and better cattle and horses. A good proof of the quality of this stock is that at all of the big Western stock shows, the users of the National Forests have been awarded more than their proportionate share of the prizes for range stock; often not only securing the first prizes but also the highest market price for their stock. The increase in number of stock is shown by the fact that from 692,124 head of cattle and horses and 1,514,330

head of sheep and goats on 85,852,229 acres in 1905, there has been an increase to 2,052,000 head of cattle and horses and 7,636,000 head of sheep and goats on 155,166,619 acres in 1917, which, considering the area of the Forests at each time, means that there has been a proportionate increase of over 50 per cent in the number of stock grazed.

Perhaps next in importance to the output of beef and mutton from these lands is the influence which the National Forest ranges have upon the settlement of the country and the welfare of the local communities within and adjacent to them. In many localities distant from transportation the utilization of farm products is largely dependent upon stock feeding and in that way turning

secure a permit, and has encouraged the small owners through protective limits which guarantee the renewal of their permits within a reasonable number without reduction. It has also taken care of new settlers and new owners of small numbers of stock by reducing the permits of the large owners to a reasonable extent and in this way brought about a wider distribution of the grazing privileges. The result is that during the past year there were 31,136 permittees grazing cattle and horses with an average permit of 66 head, and 5,502 permittees grazing sheep and goats with an average of 1,389 head. There is a limit below which it is unprofitable to handle livestock and this is kept in mind in reducing the permits of the older users. Provision is made for renewal



A CONFERENCE WITH THE COWMEN

Full understanding of the objects and methods of the Forest Service in the establishment of the regulated range has resulted in the cordial co-operation of the stockmen, for it has eliminated waste and loss, increased production and otherwise given stability to the industry.

the output of the farm into beef or mutton which can be "walked to market." The farmer must have outside pasture for his stock during the period of crop production and this is furnished by the National Forest ranges, where he is secure against the encroachment of transient herds, which is not the case on the outside unregulated range. This has enabled the ranchman in many cases to successfully establish his home upon the land where otherwise he would have failed. It is why petition after petition has been presented praying for the inclusion of grazing lands within the National Forests and vigorous protests have been made against the elimination of such lands after the people had once enjoyed the use of a protected range.

The Forest Service system has guarded against monopoly through the establishment of maximum limits above which no person or corporation is allowed to

of permits to purchasers and the movement of stock to and from market.

Investigations of poisonous plants have been carried on in co-operation with the Bureau of Plant Industry with a view to the discovery of antidotes and remedies for the poison and means of eradicating such plants from the range. Work for the extermination of prairie dogs and a vigorous campaign for the destruction of predatory wild animals has been carried on in co-operation with the Biological Survey, and the control of contagious disease among livestock and its elimination from the National Forest ranges has been effectively accomplished by the Bureau of Animal Industry.

Under all these provisions the National Forest rules and regulations have given stability to the livestock industry and have aided the stockmen, while at the same time they have protected the Forest and the other in-

terests dependent upon them. As has already been said, the first problems in range management were to stop the damage which was being done by unregulated grazing and to provide pasture for the stock already there by readjustments and the opening up of unused ranges. It was soon apparent, however, that before any definite plans could be formulated for progressive range development, there must be a careful study of the plants and grasses which made up the forage crop and of the methods under which their best use might be secured. This was begun in 1907, in co-operation with the Bureau of Plant Industry, by the construction of an experimental pasture on the Wallowa National Forest in Oregon. The object was to learn whether it was possible to construct a pasture fence which would be proof against coyotes and other predatory animals, and to determine the advantages of loose grazing over herding in the handling of sheep. The results proved that a fence could be built which was proof against all kinds of predatory animals except bear, and that sheep grazing loose only required two-thirds the area used by sheep which were herded; besides

the sheep in the pasture kept in better condition than those which were herded and the lambs weighed about eight pounds more than lambs of the same grade and age from bands grazed outside under herd.

The above indicated a waste of about 50 per cent of the forage under the herding system and studies and experiments were begun to find out how this loss might be overcome. The most practicable solution has been found in the adoption of what is commonly known as the loose-herding and bedding-out system. This means simply allowing the sheep to graze naturally during the day with the least possible amount of driving or herding together into close bands and bedding where night overtakes them. In this way the damage from constant trailing back and forth to the same bed ground is eliminated. The adoption of this plan has brought about a marked improvement in the condition of the range and in many instances has enabled the stockmen to raise lambs which weighed five pounds more than the lambs raised under the old close-herding system.

Experiments were made in lambing within coyote-proof pastures on the Cochetopa National Forest, for the purpose of ascertaining the saving in labor and other expenses which could be made in this way, as well as the decrease in loss of breeding ewes and increase in the number of lambs raised which might be obtained. The results were very satisfactory and have led to the adoption of this method in other localities where areas suitable for lambing pastures were available.

Reseeding the range both by artificial and natural means was gone into extensively and experiments conducted in a great many different localities. It was found that artificial reseeding offered a reasonable chance of success only on the better portions of the range and more particularly on the mountain meadows, and that for improvement on the bulk of the National Forest range

natural reseeding of the native plants and grasses must be depended upon. It was also found that a better stand of new grass was secured on areas which were grazed after the seed had been sown than on areas from which the stock were excluded, thus proving that the range could be revegetated faster in use than in idleness.



RESTING AT NOON

A typical scene on a National Forest range. The constant award of first prizes in the big shows testifies to the quality of such stock no less than the topnotch price it always brings in the markets.

This led to the adoption on many of the National Forest ranges of what is called deferred grazing, which means simply keeping the stock off of a certain portion of the range each year until after the seed crop has matured and then by placing the stock upon it, not only utilizing the mature feed but also assisting in planting the seed for future forage crops. By this method the entire range may be reseeded naturally every four or five years and its grazing capacity increased without removal of the stock or decrease in their number.

The importance of knowing the identity, value and requirements of the plants which make up the forage crop on the National Forests is becoming more and more apparent to Forest officers and the stockmen. Such knowledge of the vegetation facilitates immediate application of new information secured by investigations on stock poisoning plants, natural and artificial revegetation, proper seasons of grazing, adaptability of range to different kinds of stock, and carrying capacity. Since this work began in 1911, collections have been made of

35,000 plant specimens representing about 4,500 different species of plants and grasses on the National Forest ranges.

It might well be said that the Forest Service has only just got started on the scientific work connected with the better management of the ranges and that there is still a big job ahead of it. No one realizes this more than the Forest officers who are charged with carrying on this end of the work and no one is more ready than they to assume the responsibility of the task.

The carrying out of the plans for improvement in range conditions and better management of stock which

have already been inaugurated will increase the grazing capacity of the ranges fully 15 per cent within a reasonable number of years and there is no doubt but that other knowledge will be gained which will point the way to still greater advancement. The progress which has been made in range management and range improvement on the National Forests is a splendid illustration of practical conservation, which means fullest possible use without waste, and with the support and co-operation of the stockmen the National Forests will continue to add to the welfare of the live stock industry and be an important factor in keeping up the country's meat supply.

TREE TIED IN KNOT

TREES, like human beings, can be trained to do all sorts of things when they are young. Any one can see a moral in that, but this article is not for that purpose. The picture shows a single apple tree, not two, as seems to be the case, sending up two shoots from a common root stock. About twenty years ago the owner conceived of the idea of tying the tender shoots into a



FRUITFUL—THOUGH APPARENTLY A FREAK OF NATURE

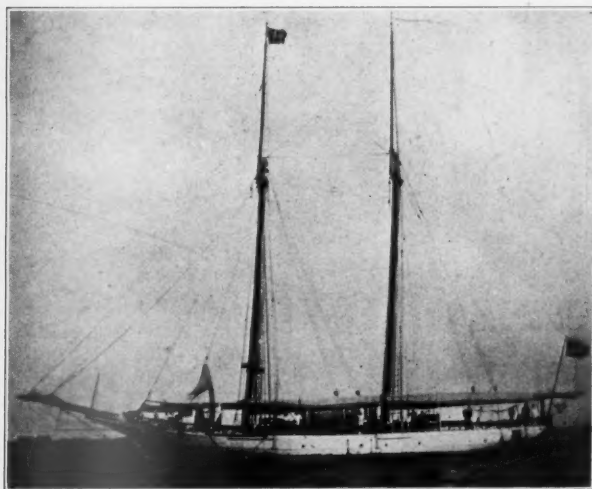
The striking deformity of this apple tree has never affected its ability to bear luscious and tempting fruit.

knot to see what would come of the experiment. Above the knot the branches were tied together to keep them from spreading, which, in the course of time, caused the two shoots to grow with a stove-pipe bend in them. This crooked shape of the tree has never interfered with its fruit-bearing qualities. The owner has received tempting offers to cut the tree down and place the knot portion in a museum, but he prefers to allow it to grow.

SHIP BUILT OF MAHOGANY

THE historic old ship shown in the illustration is the "Matchless," now used by the Government in the Coast and Geodetic Survey service. She was built by pirates near Key West, 1859, of the mahogany stolen from a stranded merchant vessel. Her timbers and frame are of this valuable wood, but the planking is of oak. When completed she was used in the slave trade, and it is stated that she was the last vessel to bring a cargo of blacks from the West Indies to the United States.

When the Civil War broke out the "Matchless" became a blockade runner. She made a number of trips, and, although chased by Union gunboats on several occasions, she managed to elude them. When the fortunes



THE "MATCHLESS"

The photograph of this old-timer is particularly interesting today, in view of our emergency fleet of wood. And it must be remembered, too, that after many vicissitudes she is still actively doing her "bit."

of the Confederacy were on the wane and Jefferson Davis decided that it was time to make his escape, the "Matchless" was selected to convey him and was provisioned and held in readiness for the task, but Jefferson Davis failed to reach her, being captured on the way.

Shortly after the close of the war the "Matchless" was purchased by the Navy Department for a training ship, and was afterward turned over to the Coast Survey. About fourteen years ago she was sent to Baltimore to be rebuilt, and it was then that the discovery was made that the vessel had so much mahogany in her structure.

NUTS: A SUBSTITUTE FOR MEAT

BY A. MILDRED BRENNAN

"DO YOUR BIT." This, I might say is the slogan of the day. Yet, how often we fail to obey the command. It is not that we are lacking in patriotism, or that we underestimate our duty. The fact is that we do not know just wherein our duty lies. Whenever we fail to conserve food, fuel, light, energy, strength or the productivity of the soil, we are doing our bit to help Germany win its war against humanity. We are today facing the crisis in the world's history. We have gladly given our noblest manhood to be sacrificed, if need be, on the altar of freedom. We have ungrudgingly given of our wealth and will continue until we have

We have our wheatless days and our meatless days; these we have pledged ourselves to keep. We are all familiar with the substitutes for wheat. We are, however, less familiar with substitutes for meat, but among the best known of these are nuts. Our wheat and meat are feeding the soldiers at the front and the men in the training camps and hospitals all over the warring world. But our meat supply is rapidly decreasing. The rate of production is in inverse ratio to the rate of consumption. To many people the fact that nuts contain more food value than meat is a new idea; but as a matter of fact it is not new. We are all familiar with the wisdom



FOUR ENGLISH WALNUT TREES ON LAWN NORTH OF CENTRAL MICHIGAN*

These thrifty trees are bearing splendid crops, and will continue to do so, bringing to their owners not only a largely increased income, but an increase in property value out of all proportion to the original investment, as well as the satisfaction of knowing that they are adding to the great national food supply a product of the kind that will help us win the war.

given our all. But, we are told that this great war must be waged and won with food; that it will avail us little to give our money and our sons if we cannot feed them while they fight our battles. But this is not all, we have sufficient food for present demands, but, "after the war," then what? The fertile fields of Europe will be devastated; many farmers who will have survived the years of war will be so maimed that they will never more be able to efficiently till the soil. It is clearly our duty to humanity, not only to conserve food, energy and resources now, but to prepare to feed the war torn countries of Europe during the period of re-construction which must inevitably follow in the wake of the great world war.

of Solomon as demonstrated in his methods of settling the quarrel of the two women in regard to the possession of an infant, but how many of us would be surprised to know that he also proved his wisdom and knowledge in regard to agriculture and the conservation and proper selection of food. In his diary he says: "I made my gardens and orchards and planted in them all kinds of fruits. I planted gardens of nuts." The late Professor John Craig says that there King Solomon referred to the Persian (English) walnut.

We are a nut consuming, but not to any great extent, a nut producing nation. Each year, before this great war, we imported from foreign lands, nuts to the value

of from twelve to thirteen millions of dollars. If you will but consult the records you will see that this amount is far greater than the value of all the apples exported in any one year from both the United States and Canada. These records show that since 1905 the largest export of apples from this country and Canada amounted to slightly less than two and one-half millions of barrels. If we assume four dollars as the average price per barrel for these apples, you will readily see that our exports of apples were far less than our imports of nuts,—another favorable indication for the nut grower.

Since the world's great nut orchards have been turned into rivers of blood, and our source of supply of nuts has been cut off what shall we do? Pay exorbitant prices to those who have followed the example of Solomon? Or, shall we follow his example and plant gardens of English walnuts? It is unnecessary to go into details as to why we should choose the latter alternative. In the first place: nuts are high in nutriment as well as in price and the price can be lowered to almost nihil if we raise them in our gardens. Secondly: there is a domestic

market practically undeveloped and no reason why opportunity for importing is better than the opportunity for exporting. Third: nuts are not perishable. Fourth: because a mature English walnut orchard pays larger profits per acre, with less work and less expense than any other crop we know. Fifth: because the quantity consumed is steadily increasing and the price obtained constantly advancing, and today we pay from five to ten cents per ounce or from eighty cents to one dollar and sixty

cents per pound for shelled nut meats. Sixth: we must be in a position to supply a nutritious substitute for the meat supply that is constantly decreasing.

The nuts that have hitherto commanded the highest prices in the New York city markets were the English walnuts grown in the Isere Valley, France. In this valley thousands of walnut trees were growing; not in regular orchards, but for the most part scattered along roadsides, about buildings or wherever it would be impossible to raise other crops; and from these trees the inhabitants sold thousands of dollars worth of nuts yearly. How-

ever, we are all aware that practically all of the orchards and trees have disappeared from this once fertile valley and we can no longer look for our nut supply from this source. But, if these people so advantageously raised a few trees and so increased their incomes, why cannot we set out orchards, or if we cannot do this at least plant a few about our dwellings. Or follow the advice of the dean of the New York State College of Agriculture when he urges us to plant nut trees along State Highways and says: "In this way not only



THE BEST TREE EAST OF THE ROCKY MOUNTAINS

With a domestic market practically undeveloped as yet—with a demand for food products steadily increasing, and with our imports almost entirely cut off, the growing of hardy walnuts offers a splendid opportunity to the orchardist, with larger profits per acre, with less work and less expense than almost any other crop.

would the roads be beautified but the wealth of the communities would be increased."

The question now arises: Can these trees be successfully raised in a Northern climate? To answer this conclusively one has but to visit the walnut farms near Lockport, New York. Here you will see orchards of trees that have endured the frost and storms of over forty winters, with much zero weather; and may eat delicious nuts which, because of their hardiness received

from the government the name "Hardy English Walnuts." Here for nearly half a century have been grown many thousands of trees; orchards have been planted and are still being planted, and hundreds of people in New York, Connecticut, Michigan, Canada and other northern points have been supplied with hardy trees from these orchards.

Forrest Crissey, the well known writer and authority on farming and economic subjects, after touring the United States investigating English walnut orchards and conditions, wrote: "Here I found alternating rows of hardy English walnut trees and peach trees. On every side were peach trees killed out, root and branch, by the severe winter. There was not an English walnut tree in the whole orchard that showed the slightest injury from frost or anything else. They were as bright as new dollars and as thrifty as any trees I have ever seen. Then I saw the older trees with their

loads of nuts. There was no question about the performance of those trees."

When you plant another tree, why not plant the English

walnut? Luther Burbank says: "Then, besides sentiment, shade and leaves you may have a perennial supply of nuts the improved kind of which furnish the most delicious, nutritious and healthful food which has ever been known. Today the consumption of nuts is probably increasing among civilized nations faster than that of any other food; and we should keep up with this growing demand and make it still more rapid by producing nuts of uniformly good quality, with a consequent increase in health and a permanent increase in the wealth of our-



BRANCH NUTS

This is a typical cluster of hardy nuts, so when you plant another tree, why not choose an English walnut? In time it will bring you a perennial crop of delicious nuts with high nutritive value.

wealth of ourselves and our neighbors." And by so doing we will not only be showing our patriotism and doing our "bit" but we will insure to our children and our children's children a better selection of food and a safe means of revenue.

OUR FEBRUARY COVER

MANY compliments have been received regarding the beautiful picture shown on the cover of the February issue, which is a reproduction of a painting of Lake Louise, in the Canadian Rockies, made by Mr. Walter Wilcox and used by us through his courtesy and that of the Mathews-Northrup Press, of Buffalo, New York.

CAPTAIN F. E. AMES, from District 6, United States Forest Service, has been assigned as captain of Company B, 7th Battalion, Twentieth Engineers (Forest). He is now at American University, Washington, D. C.

THE urgent deficiency bill, carrying an item of \$775,000 to cover the unusual expenditures of the Forest Service for fighting forest fires, has passed the House and gone to the Senate.

NEW HOME OF FORESTRY AT THE UNIVERSITY OF CALIFORNIA

ON THE 13th of October, 1917, the Forestry Division of the University of California invited its friends to a meeting in celebration of the opening of its new quarters in Hilgard Hall, which was formally dedicated on that date. At the time, with two of the faculty and practically the entire student and graduate personnel of the Division in the army, the moving into new and spacious quarters seemed like one of the ironies of fate, but it was an occasion which promised much for the future. With Professor Walter Mulford acting as chairman, the meeting opened with a paper by Acting District Forester Roy Headley, entitled, "Fire Protection Scheme for California Counties," which called forth much interesting discussion. Assistant District Forester C. E. Rachford then read an interesting paper on "Importance of Grazing on the National Forests of Cali-

fornia," followed by a discussion of "The Future of Forestry in California," led by State Forester G. M. Homans. Professor Willis L. Jepson, of the Botany Department, the real father of forestry at the University of California, gave interesting details of the early history of the Forestry Club, which was formed under his direction several years before the establishment of the Forestry Division. Professor Mulford in closing the meeting pointed out the need for co-ordinated action by the forest interests of the State, and appointed a committee composed of representatives of the lumber industry, the U. S. Forest Service, the Forestry Division of the University and the State Forester, suggesting that it meet, perfect an organization and take up problems needing solution. This has been done and the Forest Industries Committee, as it is called, promises to be an important



THE HOME OF FORESTRY AT THE UNIVERSITY OF CALIFORNIA

This is Hilgard Hall, named with particular fitness in honor of Dr. Eugene Waldemar Hilgard, for thirty years Dean of the College of Agriculture and always deeply interested in trees and their propagation, having planted personally many of the wonderful trees on the campus. The laboratories of the Division of Forestry are situated on the first floor of the wing shown in the foreground.

factor in the future history of forestry in California. The forestry meeting followed a large out-of-door meeting presided over by President Benjamin Ide Wheeler, held by the College of Agriculture, in dedication of Hilgard Hall, at which the life and work of Dr. Hilgard and his influence on the agriculture of California were depicted in several interesting addresses. During the day, the entire building was open to visitors, each of the seven divisions occupying the building, displaying its apparatus and method of work in the new quarters.

It is singularly fitting that forestry should be housed in a building named for Dr. Eugene Waldemar Hilgard, for thirty years Dean of the College of Agriculture. He was called to the University of California in 1875 and established here the first Agricultural Experiment Station in the United States. Although his interest centered in the study of soils, in which subject he became the country's leading authority, he was always interested in trees and their propagation and many of the trees on the campus were planted either by himself or under his supervision. He introduced and experimented with the Cork oak of Spain (*Quercus suber*), the English oak (*Quercus robur*), several species of *Eucalyptus* and other exotics. His faith that trees could be

successfully grown in the semi-arid Berkeley Hills has been justified, not only by the large number of trees which now beautify the campus, but by several thousand acres of successful watershed plantings which clothe the hills from Richmond to Redwood Peak. A plantation of Blue gum (*Eucalyptus globulus*) which stands just south of the new building as a living monument to his interest in trees, is now 35 years old, and though but eight-tenths of an acre in area, contains over 200 cords of wood. So it is that the Forestry Division feels very much at home in a building with the name of Hilgard above the door.

Hilgard Hall occupies the most prominent position on the campus with respect to the City of Berkeley and is in several ways an unique building. It is one of four

buildings presented to the University by the people of California, by a vote of \$1,800,000 of State bonds, in November, 1914, and is the second of three buildings which will some day form the complete agricultural quadrangle. The structure is one of the few buildings in the United States to be decorated in colors by means of Sgraffita work, an Italian method of decoration obtained by means of sculptured colored layers of plaster one over the other. The ornamental designs thus brought out in shades of old rose and brown against the grey plaster finish, are symbolic of various agricultural activities. The sheaf of wheat, the flail and basket, the bull's head and fruits predominate in the design, while forestry is represented by sprays of oak leaves and acorns.

The building is, roughly, 300 feet long by 60 feet wide, but has four distinct turnings to conform to the archi-

tectural plan for the Agricultural group of buildings which calls for an inner court, following the plan of old Tuscan farms. The principal facade, 180 feet in length, faces the west and its ten massive columns are surmounted by an attic wall bearing in large sculptured letters the inscription which typifies the aim of the institution, "To Rescue for Human Society the Native Values of Rural Life." From the top of this wall



ONE OF THE RESEARCH LABORATORIES

This gives a good idea of the size and equipment of each of the other three research laboratories, although this one has been temporarily fitted up as a club room and reading room for the men of the Forestry Club.

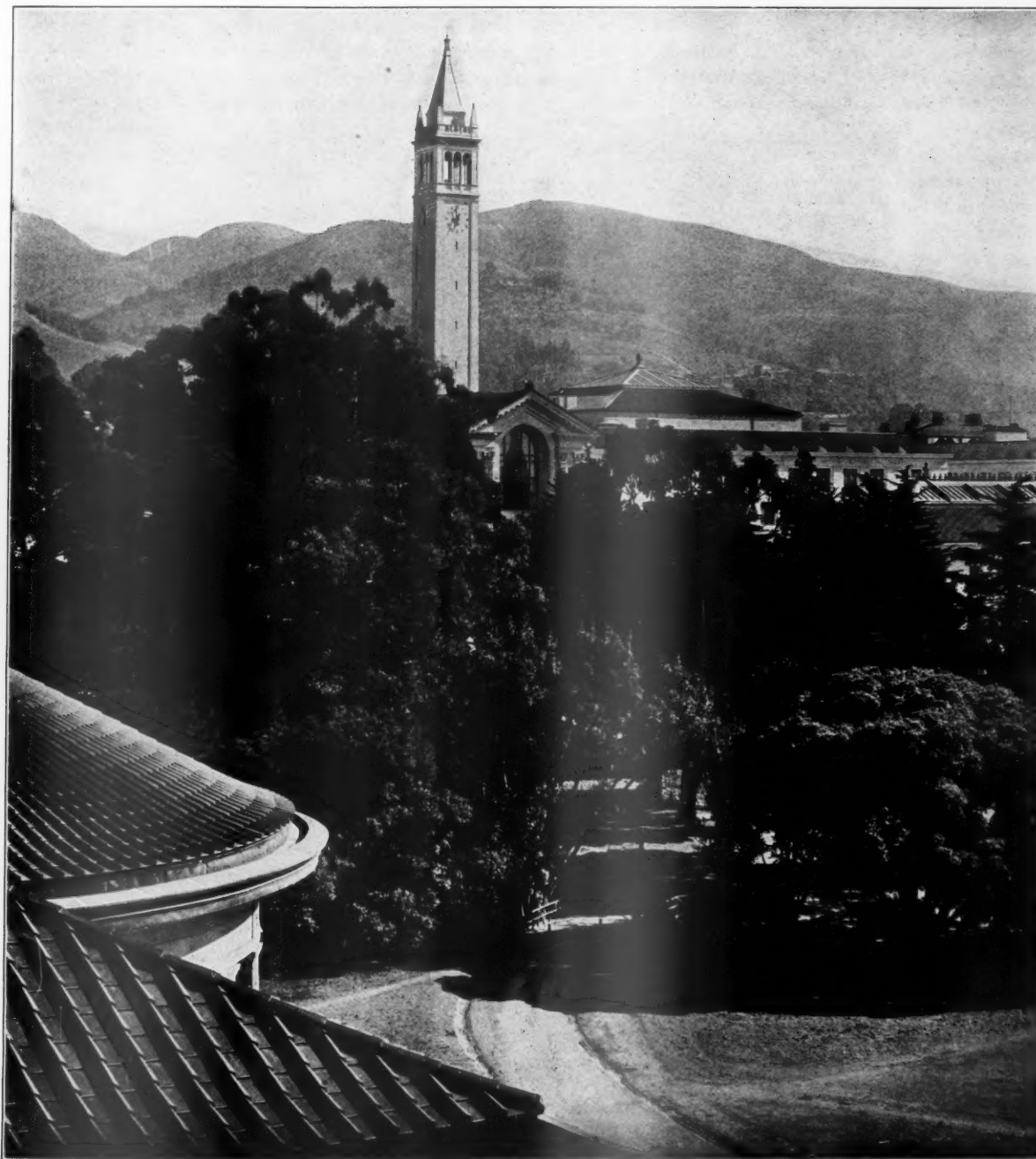
a splendid view of San Francisco Bay, the Golden Gate and Mount Tamalpais, unfolds to the west, while the soft browns of the Berkeley Hills to the east, broken here and there by the green of plantations, completes a fascinating panorama. The building is roofed in red tile and in arrangement and appearance is of the same general type as all the newer campus buildings, having three main floors and a basement floor. Its erection marks another step toward completion of the Phoebe Apperson Hearst plan for the development of the campus, which is progressing under the direction of Mr. John Galen Howard, the supervising architect.

Hilgard Hall cost \$350,000 to build, and an additional \$25,000 was expended for its equipment. Six divisions of the College of Agriculture, besides Forestry, are

housed within it. It contains a total of 111 rooms, of which 95 are offices, laboratories and class-rooms, while 16 are given over to machinery, janitor and lavatories. Halls and stairways take up about a third of the total of 62,400 square feet area of the four floors, leaving a total effective floor space in the 95 rooms of 35,200 square feet.

The fourth floor is given over almost entirely to offices of the various divisions. Two of the five private offices of the Forestry Division open into a large general

office and all of them have access by means of large French windows to the north garden court. This court, one of two located just behind the attic wall bearing the inscription, is fifteen feet wide by seventy feet in length, floored with tile, and has access by means of a stairway at one end to a long promenade on the roof of the building. The court is completely enclosed except to the sky, and is fitted with several benches set in deep arched alcoves from the top of which hang electric light fixtures of decorative design. It offers convenient passage way



BEAUTIFUL VIEW FROM THE ROOF OF HILGARD HALL

This shows Sather Tower, 305 feet high, in which hang the Sather Chimes. They were installed in November, 1917, and ring three times daily. The face of the clock in the tower is 18 feet in diameter, the hands being made of wood 2 inches in thickness, said to be Norway spruce. The beautiful trees shown include the Coast Live Oak, California Laurel, Redwood, Monterey Cypress, Monterey Pine, Blue Gum and Manna Gum, the first two of which only are native to the campus.

between the offices and a splendid opportunity for out-of-door meetings of the Forestry Club. The six office rooms have a total of 1,296 square feet of floor space, and with the exception of the general office are uniform in size and equipment. A buzzer system connects them and a standard Forest Service telephone line has been installed between the general office and the laboratories downstairs.

The forestry laboratories occupy the entire north half of the ground floor where there are thirteen rooms besides two large rooms in the basement, the fifteen having a total floor space of 4400 square feet. Also one of the four large lecture rooms in the building has been assigned to the Forestry Division for its exclusive use. This brings the number of forestry rooms to 22 with a total floor space of 8900 square feet, and apportioning the cost of the building according to floor area, makes an investment of \$95,000 in the space devoted to Forestry. If instruments, laboratory, field and miscellaneous equipment are included, the total invested in forestry at California, is approximately \$110,000.

Before the plans for the building were finished the forestry space was apportioned among the members of the staff, each of whom designed or specified equipment which would best suit his particular needs. As a result there are several features worthy of special mention. All of the storage space for equipment, with a few exceptions, is provided for in units of three types but uniform size, which can be taken down and set up in any combination designed for a particular room. The exceptions are: the lantern slide collection which is housed in four special units allowing the viewing of sixty slides at a time and providing space for 2,400 slides; the herbarium and tree seed collections, for which insect proof steel cases are used; the instrument room equipment, which is of special design, and the store room.

The general forestry laboratory where most of the classes are held, is fitted with lecturer's desk and twenty-five chairs, desks for forty students, a revolving map

rack, stereopticon and screen and storage units. Across the hall is a room 20 x 40 feet which will be devoted to models showing logging machinery and how it is used. A board platform occupies the center of the room, on which can be built up and taken down complete donkey setups in miniature to demonstrate methods of stringing line and similar points. Glass cases about the walls will contain electrically propelled models of standard logging machines, while several manufacturers have provided wall displays of saws, axes, peavies, wire rope and other logging tools.

Between the logging room and the instrument room are four research laboratories which can be turned over to students who may be working out problems in any one of the four major branches of forestry. One of

these contains the beginning of a collection of forest tree seeds of the world, steel seed storage units, two standard germinating ovens and other equipment necessary for experimenting with forest tree seeds. Another of these rooms is temporarily fitted up as a meeting place for the Forestry Club.

Across the hall again is the wood technology laboratory, containing a very complete collection of specimens of wood



ONE SET OF TREE DISPLAY CABINETS IN THE FORESTRY HERBARIUM

Each vertical unit shows typical bark, foliage and fruit, seedling and lumber specimens of an important timber tree, while the map above indicates its geographic distribution.

from Japan, China and the Philippine Islands, as well as from North and South America. Display cases in this room show special uses of wood and by-products of many kinds. The wood collection contains exhibits of several foreign countries which were on display at the Panama-Pacific Exposition and later presented to the Forestry Division. The Hatch Collection of beautifully finished specimens of Pacific Coast woods is an interesting feature of this room. Between the wood technology room and the storeroom is the herbarium room containing, besides the working herbarium in its steel cases, tree display cabinets which have been objects of much interest and favorable comment. These are vertical units of four sections behind glass doors and display typical bark foliage and fruit, seedling and lumber specimens for each of the 100 most important timber trees of North America.

DONATIONS TO THE WELFARE FUND FOR LUMBERMEN AND FORESTERS IN WAR SERVICE

AERICAN FORESTRY will publish each month the list of those making donations to this fund. Many of the donations from members of the American Forestry Association so far received were made without solicitation and were inspired by reading in the magazine that a relief and comfort fund for men of the forest regiments was to be started. Many substantial contributions are being received from lumber companies and lumbermen following requests sent to them by the Secretary of the Welfare Fund for Lumbermen and Foresters in War Service, by the lumber organizations of which they are members, and by the committees of lumbermen which had charge in various sections of the United States of securing enlistments for the forest regiments. Contributions to March 13, 1918, are as follows:

Previously acknowledged.....	\$6,163.00	Frost-Johnson Lumber Co., Shreveport, La....	\$75.00
Aberdeen Lumber Company.....	25.00	Gayoso Lumber Company, Memphis, Tenn.....	5.00
The Acorn Lumber Company, Pittsburgh, Pa..	25.00	Grant Timber and Mfg. Co., Selma, La.....	25.00
Alexander Bros., Belzoni, Miss.....	5.00	C. L. Gray Lumber Company, Meridian, Miss...	10.00
Alexandria Lumber Company, Alexandria, La..	50.00	Grenshaw-Gary Lumber Co., Richey, Miss....	10.00
Allen Manufacturing Co., Shreveport, La.....	50.00	Gulf Lumber Company, Fullerton, La.....	175.00
The Edmund A. Allen Lumber Co., Chicago, Ill.	5.00	Hagenbuch, G. F., Spirit Lake, Idaho.....	25.00
Allen, E. T., Portland, Ore.....	5.00	D. H. Hall Lumber Co., New Albany, Miss....	10.00
Anderson-Tully Company, Vicksburg, Miss....	15.00	Albert Hanson Lumber Co., Garden City, La...	100.00
Asheville Members of Hoo-Hoo.....	10.55	Henze, W. A., Iron Mountains, Mich.....	5.00
Atkins, E. C. & Co., Memphis, Tenn.....	10.00	The Herman H. Hettler Lbr. Co., Chicago, Ill.	25.00
Atwater, Henry.....	10.00	Hixon, J. M., Pasadena, Cal.....	25.00
Bach, J. N., Fairbury, Ill.....	5.00	Holly Ridge Lumber Co., Holly Ridge, La....	10.00
Baldwin Lumber Company, Baldwin, La.....	25.00	Hyde Lumber Company, Lake Providence, La...	10.00
Barage Lumber Company, Barage, Mich.....	10.00	Houma Cypress Company, Houma, La.....	50.00
Barr-Holaday Lumber Company, Louise, Miss.	25.00	Hudson River Lumber Co., De Ridder, La....	62.30
Batson-McGehee Company, Inc.....	10.00	Huie-Hodge Lumber Company, Hodge, La....	25.00
Bayou Land and Lumber Co., Yazoo City, Miss.	10.00	Hungerford, H.....	1.00
J. A. Bel. Lumber Company, Lake Charles, La..	40.00	Huston, H. B.....	5.00
Bellgrade Lumber Company, Louise, Miss....	10.00	S. W. Iowa Retail Dealers.....	38.53
Berwick, Seth E., Chicago, Ill.....	5.00	Jeanerette Lbr. & Shingle Co., Jeanerette, La..	100.00
Blake, George B., Lenox, Mass.....	25.00	W. F. Johnson Lumber Co., Natchitoshes, La..	25.00
Blanchard, A. F.....	10.00	Jordan River Lumber Company, Kiln, Miss....	100.00
S. H. Bolinger & Company, Shreveport, La....	50.00	G. F. Kerns Lumber Company, Chicago, Ill....	5.00
Bomer Blanks Lumber Company, Blanks, La....	5.00	King Ryder Lumber Company, Bon Ami, La....	87.00
Bounds, J.....	25.00	Kraetzer-Cured Lumber Co., Moorhead, Miss...	10.00
Bowie Lumber Company, Bowie, La.....	100.00	Krause & Managan Lumber Co., Westlake, La..	20.00
Boyd, James.....	5.00	Lamb-Fish Lumber Co., Charleston, Miss....	25.00
Brady, J. E.....	1.00	The H. Lambert Company, Beaverville, Ill....	5.00
Brooks-Scanlon Company, Kentwood, La.....	25.00	Lacey, J. D., New Orleans, La.....	50.00
W. P. Brown & Sons Lmbr. Co., Louisville, Ky.	25.00	Lock Moore Lumber Company, Westlake, La....	50.00
Brownell-Drews Lumber Co., Morgan City, La.	25.00	Ledwick Lumber Company, Shreveport, La....	20.00
Bruner, E. Murray, Rio Piedras, Porto Rico...	5.00	Long Bell Lumber Company, Kansas City, Mo.	10.00
Bullard, F. F.....	5.00	Long Pine Lumber Company, Alexandria, La..	25.00
Burton-Schwartz Cypress Co., Burton, La....	100.00	Longville Lumber Company, Longville, La....	100.00
W. M. Cady Lumber Co., McNarry, La.....	100.00	The Lothman Cypress Co., St. Louis, Mo.....	50.00
Calcasieu Long Leaf Lmbr. Co., Lake Chas., La.	75.00	Lothman, William, St. Louis, Mo.....	50.00
The Caldwell Lumber Company.....	2.00	Louisiana Cypress Lumber Co., Harvey, La...	50.00
Carrier Lumber & Mfg. Co., Sardis, Miss.....	25.00	Lowell, Mary E.....	7.00
Central Lumber Company, Shreveport, La....	5.00	Ludington Lumber Company, Ludington, La...	75.00
Churchill-Milton Lumber Co., Glendora, Miss.	10.00	Lutcher Moore Cypress Co., Lutcher, La.....	75.00
Colfax Lumber Company, Colfax, La.....	5.00	Maurice, C. S., Athens, Pa.....	25.00
Commercial Box Company.....	5.00	McGraw & Curran Lbr. Co., Yazoo City, Miss.	10.00
The Conewango Lumber Co., Warren, Pa.....	5.00	McKenna, H. E.....	1.00
The Conklin-Reuling Company, Pekin, Ill....	5.00	The S. W. Means Lumber Company.....	5.00
Cotton Bros. Cypress Co., Morgan City, La...	10.00	In Memoriam S. G. B.....	5.00
Crosby, J. B., Chicago, Ill.....	5.00	Memphis Bank Mill Co., Memphis, Tenn.....	5.00
The B. W. Cross Lumber Co., Pittsburgh, Pa...	5.00	Minden Lumber Company, Minden, La.....	25.00
Crowell & Spencer Lumber Co., Long Leaf, La.	50.00	Mississippi Hardwood Co., Jackson, Miss....	5.00
The Cummings-Moberly Cyp. Co., Moberly, La.	50.00	Mossberger Lumber Company, Tallulah, La....	5.00
Dailey and Allen Lumber Company.....	5.00	Mullins Lumber Company, Mullins, S. C.....	25.00
L. N. Dantzler Lumber Co., Moss Point, Miss...	100.00	Munger, C. M.....	1.00
J. W. Darling Lumber Co., Wilhelm, La.....	50.00	Murphy, C. E.....	34.17
Darnell Lumber Company, Batesville, Miss....	10.00	Napoleon Cypress Company, Napoleonville, La.	25.00
Darnell-Lovex Lumber Company, Leland, Miss.	10.00	Newell Lumber Company, Eunice, La.....	10.00
Devereux, Miss M. S., Atascadero, Cal.....	5.00	J. J. Newman Lumber Co., Hattiesburg, Miss...	100.00
Dibert, Stark & Brown Cypress Co., Donner, La.	100.00	Opdenweyer-Alcus Cypress Co., Sorrento, La..	50.00
Dickson, J. W.....	2.60	Paepeke-Leight Lumber Co., Greenville, Miss...	10.00
Dollar Bay Lumber Co., Dollar Bay, Mich....	10.00	D. S. Pate Lumber Co., Columbus, Miss.....	5.00
F. T. Dooley Lumber Company, Walls, Miss...	5.00	Pawnee Land and Lumber Co., Pawnee, La....	10.00
Dorman, F. S.....	1.35	Peavey-Byrnes Lumber Co., Shreveport, La...	42.68
Dugan Lumber Company, Roundaway, Miss....	10.00	Peavey-Byrnes Lumber Co., Shreveport, La...	25.00
Eastman, Gardiner & Co., Laurel, Miss.....	100.00	Percy Stone Company, Rockford, Ill.....	5.00
Eckert, Harry K., Niagara Falls, N. Y.....	3.00	Pioneer Lumber Co., West Jackson, Miss....	10.00
Egypt Hardwood Lumber Co., Vernon, Miss...	15.00	Ramos Lumber Company, Ramos, La.....	50.00
Faust Bros. Lumber Company, Jackson, Miss...	15.00	Reeve, General C. Mc., Coronado, Cal.....	10.00
Ferd. Brenner Lumber Co., Alexandria, La....	25.00	Richey, Mrs. Martha, Portland, Ore.....	10.00
Ferguson-Palmer Company, Houlika, Miss....	10.00	Richton Lumber Company, Richton, Miss....	50.00
Fernwood Lumber Company, Fernwood, Miss...	100.00	Richman-Crosby Company, Memphis, Tenn...	10.00
Fisher, Archie.....	5.00	Riggs Cypress Company, Patterson, La.....	15.00
Fleming, Jr., Mrs. Thomas.....	1.00	Roberts Lumber and Grain Co., Shreveport, La.	10.00
Fletcher, Elmer D., Gorham, Mass.....	5.00	Rosa Lumber Company, Picayune, Miss.....	50.00
Foley, William F.....	20.00	Roselle Mill and Lumber Co., Roselle, Ill....	25.00
Forest Products Chemical Co., Erwin, Miss...	5.00	Ruddock-Orleans Cyp. Co., New Orleans, La.	50.00
Fosburgh Lumber Company.....	15.00		

(Continued on Page 179.)

SLACKER LAND AND FOOD FACTS

BY CHARLES LATHROP PACK

PRESIDENT NATIONAL WAR GARDEN COMMISSION

PERHAPS nothing better emphasizes the need for increased garden production this season in America than Lord Rhondda's appeal, early in 1918, for 75,000,000 additional bushels of wheat. Already the total exportable surplus of wheat had been shipped out of the country; yet the British food controller said that unless America could send him 75,000,000 bushels more, he could not be certain that the Allies would have food sufficient to enable them to continue the war. Within less than a year of the time we entered the war, it had come to that—unless we could export 75,000,000 bushels of wheat more than we had for export, the nations fighting for righteousness might collapse through hunger.

There can be no question that we need all the food America can possibly produce; for already, in order to ship abroad enough to supply our allies, we must go on short commons ourselves, as we are doing on meatless and wheatless days. So great is the total food shortage in the allied countries that all we can produce will scarcely suffice to feed the allied populations.

In a more literal sense than ever before, America is the "granary of the nations." No one of our allies was self-supporting before the war, and each becomes less able to produce food as the war goes on. Thousands of acres of the best farm lands in France and Italy, and practically all of Belgium, are held by the enemy. Thousands of other acres are war devastated and unfit for cultivation. And the areas that have not been touched by war become steadily poorer through unskilled handling and the shortage of fertilizers. Only America can produce more food than it did before the war. And so the task of keeping our allies in bread is particularly our own.

In America food can be produced in two places: On the farms by professional food raisers, and on our community lands by small gardeners. There are no other sources of food. And the larger of these sources, the 400,000,000 acres of farm lands under cultivation, has already probably reached its maximum production. Close observers predict smaller farm crops in 1918 than we had in 1917. The farmers themselves, in their memorial to President Wilson last February, distinctly said that they could not, under existing circumstances, produce as much as they did last year, much less exceed that production. It is evident then that if we are to have more food it must come from that other source—and the only other source—the small gardens in our communities.

It is estimated that the response to the National War Garden Commission's appeal for more gardens last year

resulted in the planting of 3,000,000 war gardens. But excellent as this achievement is it is only a fraction of what might be accomplished. Probably 10,000,000 American families live in the country or in our smaller towns; so that the great majority of those families could have gardens if they desired. In fact, every one of these families could have a garden if in addition to back yard soil the vacant lands in the various communities were put to work.

The area of the vacant lots in many cities and towns is surprising. There is probably no community in the United States that does not have at least fifty acres of unused "slacker" land within its borders, much of which would produce fair crops of vegetables. And the number of communities in America is legion.

And less generally understood than this vast acreage is the potential producing ability of the land. Compared to an acre of land worked by the usual farming methods, the possibilities of land intensively farmed are surprisingly large. It is a good acre, indeed, that will yield forty dollars worth of wheat, with wheat at \$2.00 a bushel. Yet \$600 to \$800 is a small yield for land of equal fertility intensively cultivated and enriched. An acre of suitable vacant community land, divided into twenty-five or thirty plots, and well cultivated, will easily produce so much. If our urban gardeners would develop the possibilities of their back yards and vacant lots as thoroughly as the commercial food raisers have developed the possibilities of their acres, we should all eat and be filled.

Upon the urban farmer, then, rests especially the task of being his brothers' keeper—his brothers in England, in France, in Italy, and his little brothers in Belgium. It was the last straw that broke the camel's back. It will be the last pound of food that will make the scales dip on the side of righteousness. And apparently the city farmer must produce that last pound.

Our vacant lots, then, loom large in importance—as large as the rejected corner stone. As truly as something good did come out of Nazareth, so salvation can come out of them. But only if we put them to work. Our great task, then, is to organize and mobilize these "slacker" lands.

To do that, we shall have to take account of stock, just as we do in reorganizing any other business. We shall have to know how many acres we have and what they are capable of producing, and how many hands we have to work them, and a dozen other things. And these questions can be answered only by a thorough survey. The National War Garden Commission has issued a bulletin

LET us help liberty to sow the seeds of victory and do our part to make "every garden a munition plant."

Shell out and raise shell beans and potatoes and other vegetables, too—on American soil in Yankee trenches—and help the boys shell the Germans out of the Hun trenches over there.

on "How to Organize a Community for Production," which will be sent upon request to anyone wishing it, and which points out the way to set all these idle acres to work.

In putting these spaces and our back yards to work, we must this year plant with particular reference to national and international conditions rather than with reference merely to our own needs. We can ship to our allies only certain foods—foods that contain large food value in small bulk—and we must ship such enormous quantities of these that we shall inevitably run short ourselves. Wheat, meat, sugar, and fats are the foods in greatest demand for export. They meet the conditions. As it was with the wheat, which we could ship only by going without it ourselves, so it is with the meat, and the fats, and the sugar. We must cut down our own consumption of these articles in order to have enough for our army and our Allies. And in our gardens we must try to produce substitutes for the things we ship abroad.

So the potato assumes an importance in suitable "slacker land" garden cultivation that it has never had before. The potato is in many respects a substitute for wheat. It contains various food elements and in fairly generous quantities. It has good fuel value. It is a bulky food, and above all, it is easy to handle and keep in its fresh state. Many of our garden vegetables have small food value and must be eaten at once or they decay. Not so the potato. So the town gardener will do well this year to try to raise a part or all of his own potatoes if suitable "slacker land" is available.

Dried or shell beans are a thoroughly desirable crop for this year's gardens. So great is the food value of beans that beans occupy a prominent place in the dietary of the United States soldier. In fact, the Army Commissary Department has just commandeered the entire bean output of the Pacific coast states, amounting to many million bushels. Beans furnish both protein for rebuilding worn out tissue, and motive power to drive the human engine. With a large part of the bean crop thus lifted out of the market, it is evident that there must be some shortage of beans this year, and the home gardener will do well to grow his own supply. It requires no canning or preserving, as do some other garden products before they become commercially available. Of the bean we might truthfully write, "Multum in parvo." So plant beans for one thing.

From still another point of view is it necessary to develop our urban garden possibilities to the utmost, and that is the point of view of transportation. The past six months has furnished us with striking examples of traffic difficulties. Ships were so scarce that we could not put on shipboard the materials the railroads hauled to tide water; so 26,000 carloads of materials were dumped in the Newark meadows alone, in order to free the cars, while thousands upon thousands of other cars stood for weeks waiting for the day when ships became available to take their loads. Then came cold weather, and for lack of sufficient cars and locomotives we suffered from lack of coal; and while other freight was embargoed to

let the coal come through, there piled up such mountains of freight awaiting shipment that it will be months before the railways can catch up. And much that they must transport is food. Every ounce of food that the home gardener can raise for himself instead of having it shipped to him from a distance, therefore lightens the burden of the railroads. Thus, by producing his own food, f. o. b. the kitchen door, the home gardener will kill two birds with one stone.

It has always been the case that a prophet is not without honor save in his own country. Distance still lends enchantment to view. Only the near at hand, the commonplace, the homely, is mean and ignoble. So mankind still yearns for other worlds to conquer and despises the opportunities for service that lie ready at hand. To but few of us is it given to do great things. And in fact we are not qualified to do great things until we have first learned how to do well the little things, "You have been faithful in a few things, I will make you ruler over many things," runs the divine order of progress. But few of us, relatively, can do great things in this struggle for righteousness; yet each of us can do the small things, which, taken together, make a great whole. In a very real sense, then, the man with the hoe is a soldier of the soil. And as this war must be fought and won, in the last analysis, by the great body of privates, so the food problem can be, must be, and will be, solved by home vegetable growers. In a multitude of gardeners there is safety. Let us remember, then, that America expects every gardener to do his duty.

DONATIONS TO THE WELFARE FUND FOR LUMBERMEN AND FORESTERS IN WAR SERVICE

(Continued from Page 177.)

Russe & Burgess, Isola, Miss.....	\$10.00
Sabine Lumber Company, Beaumont, Texas...	25.00
St. Bernard Cypress Co., Arabi P. O., La.....	25.00
Schwing Lmbr. & Shingle Co., Plaquemine, La.	25.00
Scull, H. E.....	4.00
Seidel, Julius.....	10.00
Sherman, Jr., John Abner, Calumet, Mich....	1.00
Siller, E. J., Cleveland, Ohio.....	25.00
E. C. Sondheimer Co., Sondheimer, La.....	15.00
Southern Lumber Company, Myrtis, La.....	25.00
Southern Lumberman, Nashville, Tenn.....	25.00
Stahl, C. J.....	10.00
Stockton Members of Hoo-Hoo.....	50.00
Sunflower Lumber Company, Clarksdale, Miss.	5.00
Tallahatchie Lumber Company, Philip, Miss..	25.00
Texas Lumber Company, Shreveport, La.....	10.00
The Tionesta Lumber Company.....	10.00
Tremont Lumber Company, Winnfield, La....	50.00
Triangle Lumber Company, Percy, Miss.....	10.00
Valley Log Loading Co., Memphis, Tenn.....	5.00
Victoria Lumber Company, Shreveport, La....	25.00
Vosburgh, W. W., Pittsburgh, Pa.....	5.00
Ward Lumber Company, Sunflower, Miss.....	10.00
The H. Weston Lumber Co., Logtown, Miss...	100.00
Wetmore, George Peabody.....	150.00
Weyerhaeuser Timber Co., Tacoma, Wash....	500.00
The J. R. Wheler Company.....	5.00
J. W. Wheeler & Co., Oakgrove, Miss.....	10.00
White Oak Lumber Co., Coal Grove, Ohio....	25.00
Whitecastle Lbr. & Shgle. Co., Whitecastle, La.	25.00
F. B. Williams Cypress Co., Patterson, La....	100.00
Wilson & Cochran, Inc., Lottie, La.....	10.00
A. G. Wineman & Son, Greenville, Miss.....	5.00
Wistar, Underhill and Nixon.....	50.00
Wolfe, H. E.....	1.00
Total.....	\$11,825.18

AMERICAN FORESTERS IN MILITARY SERVICE

This list is compiled from various sources. Every effort has been made to make it complete and accurate, but in the nature of things there are necessarily omissions and errors. The list will be reprinted and increased from month to month. All foresters and others who can supply additional names or note corrections are urged to communicate with American Forestry as promptly as possible, to the end that the list may have full value as a record of the men who have gone to war.

AGEE, Fred B., 1st Lt., Engr. Corps (For.); U. S. R., A. E. F., P. O. 702, via N. Y., deputy forest supervisor, U. S. F. S.
Adams, George (Ohio State Univ.), 10th Eng. (For.).
Albano, Jack, forest ranger, U. S. F. S.
Alden, E. E. (Mich. Ag. Col., '18).
Aldous, Tura M., grazing, U. S. F. S.
Aldsworth, Donald (Univ. of Minn., '10), Off. Tr. Camp, Presidio, Cal., San Diego, Cal.
Alexander, Ben. (Bilt. For. School), 2nd R. O. T. C. Alexander, J. B., 1st Lt. Aviation Corps (Univ. of Wash., '17).
Allen, Raymond, New Jersey.
Ames, F. E. (Yale For. School, '06), Capt., Co. B, 7th Bn., 20th Eng. (For.).
Anderson, A. C., 2nd Lt. U. S. A., Ft. Leavenworth, Kan. (Univ. of Wash., '17).
Anderson, Emil A., deputy forest supervisor, U. S. F. S.
Anderson, Parker O. (Univ. of Minnesota, '18), 10th U. S. Eng., France, U. S. F. S.
Archer, Frank L., Engr. Headquarters, France, forest clerk, U. S. F. S.
Armstrong, Carroll W. (Bilt. For. School), Quartermaster's Dept., Fort Dodge.
Armstrong, Ralph H. (Bilt. For. School), 104th Inf., Expeditionary Forces, France.
Atkinson, E. S. (Yale For. School, '16, and Biltmore), 2d Lt., Ft. Grant, Canal Zone.
Atwood, C. R. (Univ. of Maine, '15), manager, Unit 1, New England Sawmill Units.
Aylward, F. N. (Univ. of Calif.), Amb. Corps.

BACKUS, Romayne L. (Univ. of Minn., '18), 20th U. S. Eng., U. S. F. S.
Badertscher, Ed., temp. clerk, U. S. F. S.
Baker, Hugh P. (Yale For. School, '04), Capt. 40th U. S. Inf., Camp Taylor, Louisville, Ky., Dean N. Y. State Col. of Forestry.
Baldenbury, Max B., clerk, U. S. F. S.
Baldwin, H. C. (Penn. State, '14).
Ballew, William Murray (Yale, '15), 5th Bn., 20th Eng. (For.), Amer. Univ. Wash., D. C.
Balmer, Joseph D. (Univ. of Wash., '18), Sgt. Bat. D, 34th Fld. Art., American Lake Encampment.
Ballard, Dean (Univ. of Wash., '12), American Lake Encampment.
Ballou, F. C. (Penn. State, '10), 20th Eng. (For.), 3rd Bn., Co. C.
Barker, S. Omar, Co. D., 502nd Service Bn., Camp Merritt, N. J., U. S. F. S.
Barlow, Harold (Yale For. School, '14), 1st Lt., Ordnance, Coe Brass Bldg., Ansonia, Conn.
Barnett, William L. E. (Yale, '15), Section Sanitaire, U. 70, Convois Automobiles, par B. C. M., Paris, France.
Barr, John B., forest ranger, U. S. F. S.
Barton, Robert M., 20th Eng. (Forest), Amer. Univ. Wash., D. C.; forest ranger, U. S. F. S.
Bastian, Clyde E., Corp. 20th Eng. (For.), (Univ. of Mich., '16).
Batten, R. W. (Yale For. School, '16), 10th Eng. (For.), A. E. F.
Bay, Helmut (Mont. For. School), 20th Engineers.
Beal, Cecil R. (Univ. of Wash., '17), 2nd Lt. 20th Eng. (For.), American Univ., Washington, D. C.
Beaman, Clarence W., messenger, U. S. F. S.
Beaman, La Vaughn, Co. A, 5th Bn., 20th Eng. (For.), U. S. F. S.
Beattie, Homer Milo (Mich. Univ., '04), Sgt. 10th Eng. (For.).
Bedwell, Jesse L., forest ranger, U. S. F. S.
Beche, P. (Mont. For. School), 20th Engineers.
Behre, C. Edward, Co. F, 4th Bn., 20th Eng. (For.), A. E. F., U. S. F. S.
Bell, Ernest (Univ. of Minn., '16), Lt. Rainbow Div., Camp Mills, N. Y.
Bell, George R. (Yale For. School, '18), 2nd Lt., 12th Fld. Art., A. E. F.
Bellue, A. (Student Univ. of Cal.), 10th Eng. (For.).
Belts, H. C., 1st Lt. (Mich. Ag. Col., '18).
Benedict, M. S., 1st Lt. 10th Eng. (For.); forest supervisor, U. S. F. S.
Benedict, Raymond E., Major 10th Eng. (For.), For. Br. B. C.
Bennett, Edwin L., Co. H 157th Inf., Camp Kearney, Cal., forest ranger, U. S. F. S.
Bennett, William W. (Univ. of Nebr., '12), Co. E, 314th Ammunition Train, Camp Funston, Fort Riley, Kansas, dep. for. sup., U. S. F. S.
Benson, A. O., 3rd R. O. T. C., forest examiner, U. S. F. S.
Bentley, George A., Capt. Quartermaster's Dept., purchasing agent U. S. F. S.
Bernhardt, Carl L. (Univ. of Wash., '18).
Berry, John K., scaler, U. S. F. S.
Berry, Swift, forester, U. S. F. S.
Betts, Fred H., forest ranger, U. S. F. S.
Bevan, Arthur (Univ. of Wash., '17); Canadian Eng., France.

THE ROLL OF HONOR

IN THIS ROLL OF HONOR WE WILL PUBLISH EACH MONTH AS THEY ARE RECEIVED OR REPORTED TO US, THE NAMES OF FORESTERS WHO MEET DEATH IN SERVICE.

AUGSPURGER, STANLEY R., Dayton, Ohio, field assistant, U. S. F. S., District 6. Lost on the "Tuscania."

MUNCASTER, ROY, Ranger, U. S. F. S., Olympic National Forest. Lost on the "Tuscania."

REES, H. S. (Univ. of Wash., '14), Canadian Contingent, killed in battle in France.

REES, L. A. (Univ. of Wash., '14), Canadian Contingent, killed in battle in France.

SHARP, MILTON K. (Univ. of Ohio, '16), Bat. A, 134th Field Art., killed December 3, 1917, Montgomery, Ala.

SIMPSON, C. E. (Penn. State Col., '16), 10th Eng. (For.), died in Scotland October 3, 1917.

SMITH, A. OAKLEY (Yale For. School, '14), killed while training for aviation, drowning in Delaware River by fall July 21, 1917.

YOUNG, DOUGLAS E., private English Army, killed in France April 10, 1917, was State Forest warden, Maryland.

Bevan, Jesse T., Co. E, 10th Eng. (For.), A. E. F., France, U. S. F. S.
Beyers, Walter F. (Univ. of Minn., '12), Capt., Camp Dodge, Iowa.
Billin, K. T. (Penn. State, '20), 10th Eng. (For.).
Billings, R. W. (Mich. Ag. Col., '17), 10th Eng. (Forest).
Billingslea, James H., Jr. (Univ. of Wash., '11), Top Sgt., 10th Eng. (For.), forest ranger, U. S. F. S.
Bird, R. G., Corp. 20th Eng. (For.); (Cornell, '16).
Bird, Vern A., 20th Eng. (For.), forest ranger, U. S. F. S.
Blair, Albert W., 20th Eng. (For.), forest ranger, U. S. F. S.
Blair, Earl M. (student Univ. of Cal.), 20th Eng. (For.).
Blake, Philip (Univ. of Minn., '16), Marine Barracks, Quantico, Va.
Bliss, James (Ohio State Univ., '14), Capt., Chillicothe, Ohio.
Bloom, Adolph, Ensign U. S. N. Train. (Univ. of Wash., '16).
Blouse, Joseph R. (Mt. Alto, '16), Pa. Dept. For.
Boisen, Rev. Anton T. (Yale, '05), Secretary, Y. M. C. A., 31 Ave., Montaigne, Paris, France.
Bonner, James H., Capt., 1st Co., E. O. T. C., Camp Lee, Petersburg, Va., acting dean Mont. For. School.
Bonney, Parker S., sub. lt., Br. Navy (Univ. of Wash., '13).
Bosworth, James H. (Univ. of Mont.), 20th Eng. (For.), Amer. Univ., Wash., D. C., U. S. F. S.
Bothfield, Harry Julius (Yale, '12), Corp., 302nd Inf., Co. H, Camp Devens, Mass.
Bowen, James H., 20th Eng. (For.), forest ranger, U. S. F. S.
Bowen, John S., 20th Engineers (Forest), Amer. Univ., Wash., D. C., U. S. F. S.
Bowen, Jos. B. (Yale For. School, '17), Royal Flying Corps, Camp Everman, Field 2, Fort Worth, Texas.
Boyce, W. H. (Penn. State, '17).
Bradley, Tom O. (Student Mt. Alto), 3rd Bn., 20th Eng. (For.), A. E. F., Pa. Dept. For.
Brady, Charles C. (Univ. of Wash., '18); Battery A, Wash. Signal Corps.
Brady, Seth C., messenger, U. S. F. S.
Brayton, Shirley (Univ. of Minn., '18), 20th U. S. Eng., Washington, D. C.
Breneman, Howard E. (Mt. Alto, '17), Co. C, 1st Bn., 10th Eng. (For.), A. E. F., Pa. Dept. For.
Brewster, Donald R., forest examiner, U. S. F. S.
Brinckerhoff, H. E., 1st Lt. Inf.
Brindley, Ralph, 2d Lt., Bat. C, 246th F. Art., R. O. T. C. (Univ. of Wash., '17), American Lake Encampment.
Brockway, M. (Univ. of Me., '15), checker, Ten Saw Mill Units.

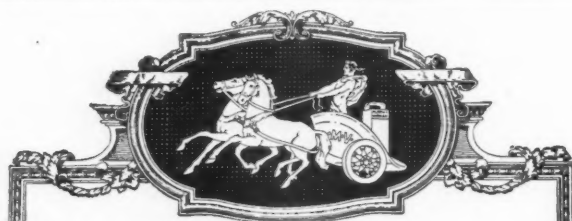
Broderick, Martin J. (Univ. of Minn., '16), 1st Sgt. U. S. Engr. Co. C, 501 BN., Engr., 20th Eng.
Brooks, James F. (Montana For. School, '17), 10th Eng. (For.), forest ranger, U. S. F. S.
Brown, Bascom H., forest ranger, U. S. F. S.
Brown, Harold B., 20th Eng. (For.), forest ranger, U. S. F. S.
Brown, R. A., Co. D, 23rd Eng. (Highway), Camp Meade, Md., U. S. F. S.
Brown, Thomas (Univ. of Minn.), Marines, A. E. F., France.
Brown, Robert C., asst. forest ranger, U. S. F. S.
Brown, V. S. (Univ. of Cal., '14), 10th Eng. (For.).
Brown, Vance, scaler (Univ. of Wash., '17), Bat. A, Wash. Sig. Corps, U. S. F. S.
Browning, Harold A., asst. for. ranger, U. S. F. S.
Broxon, Donald (Univ. of Wash., '14).
Bruce, Donald (Yale For. School, '10), Capt., 10th Eng. (For.), assigned in charge of timber, reconnaissance in France. (Prof. of For. Univ. of Cal.).
Bruce, James, U. S. F. S.
Brundage, Marsden R. (Mich. Ag. Col., '17), 20th Eng. (Forest).
Bryant, Edward S., Capt. 10th Eng. (Forest), for. inspector, U. S. F. S.
Buch, John Edward (Mt. Alto For. Acad., '17), Co. C, 1st Bn., 10th Eng. (For.), Fa. Dept. For.
Buck, Shirley, Capt., Q. M. Dept., Presidio, San Francisco, Cal., National forest inspector, U. S. F. S.
Buhler, Ernest (Univ. of Minn., '13), Sgt.
Bullerick, Ray O., Sgt., Supply Office, Camp Talliaferro, No. 1, Fort Worth, Tex. (Asst. Forest Ranger, U. S. F. S.).
Bunker, Page (Yale), city forester, Fitchburg.
Burgess, John, Corp. 66th Co., 164th Depot Brigade, Camp Funston, Kan., surveyor draftsman, U. S. F. S.
Burleigh, T. D. (Penn. State, '18), 20th Eng. (Forest).
Burnham, Carl F. (Univ. of Wis., '14), 1st Lt., U. S. Army.
Burnham, R. P. (Univ. of Wash., '17); 2nd R. O. T. C., Presidio, San Francisco, Cal.
Burt, E. H., Lt. (Mich. Ag. Col., '14).
Buttrick, P. L., Am. Amb. Serv. (Yale For. School, '11).
Byrne, Geo. J., Jr. (Univ. of Cal.); Amb. Corps.

CALKINS, Hugh G. (Yale For. School, '09), 2nd Lt., F. A. N. A., 166th Depot Brigade, Camp Lewis, Amer. Lake, Wash., forest supervisor, U. S. F. S.
Calloway, G. A. (Univ. of Mo.), 10th Eng. (For.).
Calloway, Joseph R., forest ranger, U. S. F. S.
Calvert, Gerald F. (Univ. of Wash.); Canadian Contingent in France.
Cameron, J. F. (Univ. of Wash., '19); Av. Training Camp, San Diego, Cal.
Campbell, John W. (Biltmore), 2nd Lt., Bat. C, 59th F. A.
Cappel, Frederick, for. clk., U. S. F. S.
Carney, Thomas (Mont. For. School), 20th Engineers.
Carpenter, Herbert M. (Bilt. For. School), 20th Eng. (Forest).
Carvey, Matthew (Ohio State Univ.), Aviation.
Cary, N. Leroy (Univ. of Mich., '15), 41st Co., 166th Depot Brigade, Camp Lewis, American Lake, Wash., forest assist., U. S. F. S.
Cassidy, Hugh O., forest ranger, U. S. F. S.
Cecil, Kirk P. (Kan. Ag. Col., '07), Lt. Coast Art., Ft. Stevens, surveyor, U. S. F. S.
Chamberlain, Harry (Penn. State, '14), 20th Eng. (Forest).
Chapman, Charles S. (Yale For. School, '02), Maj. 10th Eng. (For.), A. E. F., forest assistant, U. S. F. S.
Charlson, Alex. (Univ. of Wash., '16); Canadian Contingent in France.
Chartrand, Lee F. (Univ. of Wash., '16), 20th Eng. (For.), forest ranger, U. S. F. S.
Chartrand, L. J. (Mich. Ag. Col., '14).
Cheatham, J. W., Corp. (Mich. Ag. Col., '10).
Chippfield, W. A. (Univ. of Mont.), 10th Eng. (For.).
Christensen, Alfred C., forest clerk, U. S. F. S.
Chubb, S. W. (Penn. State, '12), U. S. F. S.
Chudderdon, Harold A., forest ranger, U. S. F. S.
Clark, Charles R. (Yale, '10), recommended for commission in 20th Eng., but no further action taken.
Clark, Donald H. (Univ. of Wash., '17), 1st Lt., Bat. F, 248th Field Art., American Lake Encampment.
Clark, E. V., 1st Lt. R. O. T. C., Camp Funston, Kan., forest supervisor, U. S. F. S.
Clemensen, Harold, 2nd Lt. (Mich. Ag. Col., '17).
Clemmons, Walter C., 20th Eng. (For.), A. E. F., forest ranger, U. S. F. S.
Clifford, C. J., Sgt., 10th Eng. (For.), A. E. F., France, forest clerk, U. S. F. S.

- Colburn, H. C., 10th Eng. (Forest), Co. B., Expeditionary Forces, France, U. S. F. S.
- Colgan, J. G., 1st Lt. (Mich. Ag. Col.).
- Colledge, Edward W. (Bilt. For. School), Am. Amb. Serv., France.
- Colter, Charles S., U. S. F. S.
- Colville, L. F. (Mont. For. School), 10th Engineers.
- Condon, H. R. (Penn. State, '12), 2nd Lt. 10th Eng. (Forest), Pa. R. R. forester, Phila., Pa.
- Cone, Theodore (Univ. of Minn.), Santiago de Cuba, care of Postmaster, N. Y.
- Conklin, J. (Univ. of Cal., '16), 20th Eng. (For.).
- Conklin, W. Gardiner, 1st Lt. 20th Eng. (Forest), Co. D, 4th Bn. (Pa. State For. Acad., '08); Pa. Dept. For.
- Connor, Frank W., 12th Aero Squadron, Wright Branch, Dayton, Ohio, forest guard, U. S. F. S.
- Conrad, H. H. (Penn. State, '21).
- Cook, Arthur M. (Yale, '08), Lt., 3rd Co., E. R. O. T. C., Camp Lee, Petersburg, Va., forest supervisor, U. S. F. S.
- Cook, G. D. (Mich. Agri. College), 1st sergt. 10th Eng. (Forest).
- Cook, Marcus (Univ. of Mont.), 20th Eng. (For.).
- Cook, John W., clerk, U. S. F. S.
- Cook, H. O., Capt., 2nd Forest Regiment, Mass.
- Cook, Samuel (Mont. For. School, '18), Training Camp, American Lake, Wash., forest ranger, U. S. F. S.
- Coolidge, Philip T. (Yale, '06), Signal Corps Office, 816 Consumers' Bldg., Chicago, Ill.
- Cookston, Roy, Capt. 10th Eng. (Forest).
- Cool, Frank J., 25th Engineers, Camp Devens, Mass. (Topographic Draftsmen, U. S. F. S.).
- Cool, W. C., 2nd Lt. (Cornell, '16).
- Coolidge, Lieut. Joseph (Harvard, '12), 20th Eng. (Forest), consulting forester.
- Cope, H. H. (Penn. State, '15), 10th Eng. (Forest).
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 Kobbe, William H. (Yale For. School, '04), Capt., 30th Eng. (For.), A. E. F.
 Koch, Elera (Yale, '03).
 Koehlein, John H., National Army, Camp Lewis, American Lake, Wash., fire guard, U. S. F. S.
 Kolemman, N. Sgt. (Mich. Ag. Col., '19).
 Koomey, L. H. (Yale For. School, '12), Co. C, 1st Bn., 20th Eng. (For.), A. E. F.
 Korista, Dromir (Univ. of Minn.).
 Kotsier, John, Capt., Field Art., Presidio, San Francisco, Cal., temporary force, U. S. F. S.
 Kraebel, Charles J., (Univ. of Mich., '12), Sgt., 10th Eng. (For.) A. E. F., France, forest assistant, U. S. F. S.
 Kraft, F. G. (Univ. of Mo.), 10th Engr. (Fr.).
 Krause, John E., Co. H, 367th Inf., Camp Lewis, Wash., U. S. F.
 Krell, Frederick C. (Penn. State, '13), Sergt. 1st class, 10th Eng. (Forest), Asst. Forester Pennsylvania Railroad.
 Krell, J. W. (Penn. State, '17), timber inspection.
 Krueger, Myron E. (Univ. of Cal., '17), 20th Engineers (Forest), forest ranger, U. S. F. S.
 Kuemmerling, Karl (Ohio State Univ., '16), Hospital Unit.
 Kunkle, A. V. (Univ. of Mont.), 10th Eng. (For.).

LAFON, John (Biltmore), Capt. 10th Eng. (For.), Forest Branch B. C.
 Lamonte, A. D. (Penn. State, '18).
 Langille, H. D., Major, 20th Eng. (For.), A. E. F.
 Lackamp, Leo (Ohio State Univ.), Naval Reserve, U. S. S. Colpher, Municipal Pier, Chicago, Ill.
 Larson, Arthur K. (Univ. of Wash.), Sgt., For. Reg., France.
 Larrimer, W. H. (Ohio State Univ., '13), Officers' Training Camp, Chillicothe, Ohio.
 Larson, Andrew H., 20th Eng. (For.), forest ranger, U. S. F. S.
 Latane, William (Yale, '08), recommended for commission in 20th Eng.
 Leach, Walter (Mt. Alto, '14), Co. Hdqtrs., 314th Inf., Camp Meade, Md., Pa. Dept. For.
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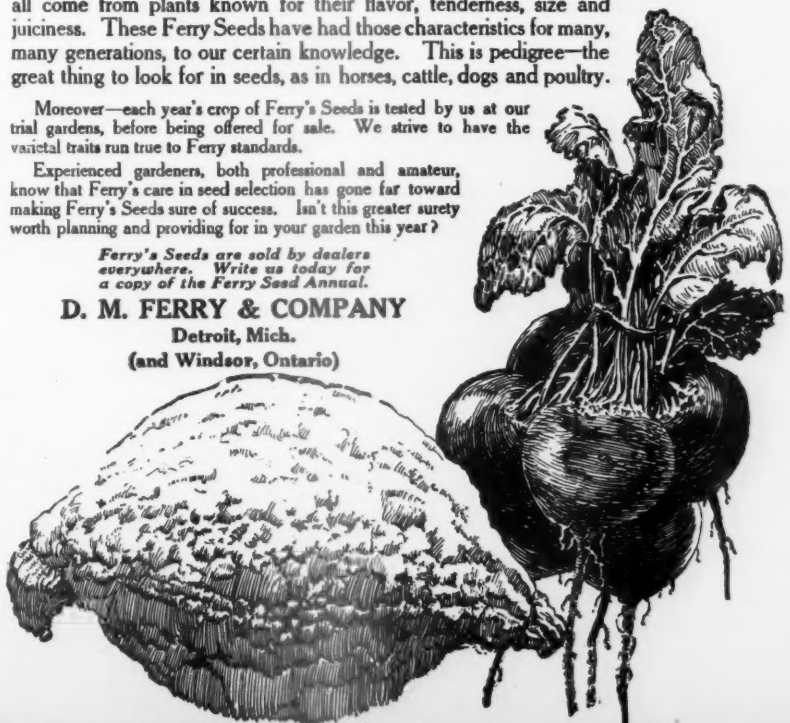
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Lind, Fred (Univ. of Wash. Law), 1st Sgt., 45th Co., 160th Depot Brigade, Camp Lewis, American Lake, Wash., U. S. F. S.
Lindsey, Eugene L., 1st Lt. 10th Eng. (Forest), (Yale For. School, '11), forest examiner, U. S. F. S.
Littlefield, Theron R., Corp., Hdq. Co., 340th F. A., Camp Funston, Kas., forest ranger, U. S. F. S.
Livingston, R. (Penn. State, '19), 10th Eng. (For.).
Lockbridge, Earl (Mont. For. School), Coast Art. Lockwood, Milton K. (Biltmore), 1st Lt., School of Military Aeronautics, Austin, Tex.
Loetzer, Louis C. (Student Mt. Alto, '19), Co. A, 41st Bn., 20th Eng. (For.), Camp Amer. Univ., Washington, D. C.
Lommason, Thos., 10 Engineers (Forest), Am. Exped. Forces, France, U. S. F. S.
Long, Edward (N. H. State Col., '17), U. S. F. S.
Lord, Milton (Univ. of Minn.), U. S. Marine Barracks Headquarters Detachment, 1st Rgt., Philadelphia, Pa.
Loud, William D., 20th Eng. (Forest).
Loughlin, John D., Amb. Corps (Cornell, '17).
Loveman, A. M. (Yale For. School, '16), Cost Inspection, Bethlehem Shipbuilding Corp., Providence, R. I.
Lowdermilk, Walter C., 10th Engineers (Forest), Am. Exped. Forces, France, U. S. F. S.
Lundgren, Leonard, Capt., 110th Engrs., Camp Mills, N. Y.
Luther, T. F., 20th Eng. (Forest), (Cornell, '17).
Lyle, Ben, 10th Eng. (For.), A. E. F., U. S. F. S.
Lyman, R. R. (Penn. State, '18), 10th Eng. (For.).
Lyon, A. C. (Mich. Ag. Col.).

MACKECHNIE, A. R., 2nd Lt. U. S. A. (Univ. of Wash., '18).
Malmstein, Harry E., grazing assistant, U. S. F. S.
Macaulay, N. G., Camp Lewis, American Lake, Wash., forest ranger, U. S. F. S.
Maloy, Thomas P., 20th Eng. (Forest), Co. B, 5th Bn. U. S. F. S.
Markworth, Gordon D. (Yale For. School, '17, and Ohio State Univ.), Co. C, 20th Eng. (For.), Va. State For. Dept.
Marsh, A. Fletcher (Yale For. School, '11), Capt., Q. M. Sec., O. R. C., Wash., D. C.
Marston, Charles O. (Biltmore), 10th Engineers (Forest).
Marston, Major Roy L. (Yale, '02), 103rd U. S. Inf., Co. E, France.
Martin, Dean (Univ. of Minn., '11).
Marshall, Eugene, Co. A, 347th Machine Gun Bn., Camp Lewis, Tacoma, Wash., U. S. F. S.
Mason, David T. (Yale For. School, '07), Capt., 10th Eng. (For.), Prof. of For., Univ. of Cal.
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Mathew, Waldo (Univ. of Wash., '19), Co. 8, 160th Depot Brigade, American Lake Encampment.
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McAdams, Richard, U. S. Marines, Marine Barracks, Mare Island, Vallejo, Cal., U. S. F. S.
McClure, B. M. (Mich. Ag. Col., '17).
McCullough, Thomas E. (Yale For. School, '11), E. O. T. C., Camp Lee, Va.
McCutcheon, P. (Penn. State, '20), 20th Eng. (For.).
McCutcheon, T. D. (Penn. State, '20), 20th Eng. (For.).
MacDaniels, E. H. (Yale, '09), 20th Eng. (For.).
McDonald, Edmond H. (Univ. of Wash., '17).
McDonald, W. A., Capt. (Mich. Ag. Col., '13).
McDowell, Willard, U. S. F. S.
McGillcuddy, Blaine (Univ. of Wash.), forest regiment, France.
McGlaughlin, Eugene R., 20th Eng. (Forest).
McKnight, Roscoe, 1st Lt. 10th Eng. (Forest), U. S. F. S.
McNulty, A. R. (Wyman Sch. Woods, '17), Co. C, 1st Michigan Engineers.
McNulty, L. Edgar (Mt. Alto For. Acad., '17), Co. C, 1st Bn., 10th Eng. (For.), A. E. F., Pa. Dept. For.
McPherson, Benj. D. (Mt. Alto For. Acad., '16), Co. C, 1st Bn., 10th Eng. (For.), A. E. F., Pa. Dept. For.
McQuarrie, Claude (Mont. For. School, ex '19), West Point.
Meek, Chas. R. (Mt. Alto, '12), Sgt., 20th Eng. (For.), Co. D, 4th Bat., A. E. F., Pa. Dept. For.
Meloney, Henry M., 20th Eng. (Forest), forest ranger, U. S. F. S.
Mendenhall, F. D., Corp., Headquarters Detachment, 7th Reg. Engr., Ft. Leavenworth, Kan., surveyor draftsman, U. S. F. S.
Mengel, A. W. (Wyman Sch. Woods, '17), 20th Eng. (For.).
Merrill, James D. (Biltmore), 2nd Lt., 342nd Inf., Camp Grant, Ill.
Mershon, William B. (Biltmore, '10), 10th Eng. (Forest), sergt. 1st class.
Meschke, Karl G. (Mich. Ag. Col., '15), 20th Eng. (Forest), Co. E, 4th Bn. forest assistant, U. S. F. S.
Meyer, L. A., 10th Eng. (Forest).

Meyer, Leo. W. (Yale For. School, '17), Sgt., 1st class, 10th Eng. (For.), A. E. F.
Meyers, O. W. (Penn. State, '18), 10th Eng. (For.).
Middour, Joseph C. (Mt. Alto, '16), Co. C, 1st Bn., 10th Eng. (For.), A. E. F., Pa. Dept. For.
Miles, Clark, Lt., Co. C, 146 M. G. Bn., 41st Div., Camp Merritt, N. J., forest examiner, U. S. F. S.
Millar, W. N., Capt. (Yale For. School, '08), Univ. of Tor., Toronto, Can.; 10th Eng. (For.), A. E. F.
Miller, Edwin B. (Mt. Alto, '17), Co. C, 1st Bn., 10th Eng. (For.), France, Pa. Dept. For.
Miller, Fred H., forest ranger, U. S. F. S.
Miller, J. M. (Penn. State, '13), 10th Eng. (For.).
Miller, W. M. (Mich. Ag. Col., '19).
Minshall, Fred S. (Ohio State Univ.), 10th Eng. (For.).
Minner, Clifford R., forest ranger, U. S. F. S.
Mitchell, E. T. (Penn. State Col. For. Dept.), U. S. F. S.
Modisette, W. M. (Biltmore), Capt. 8th U. S. Cavalry, U. S. F. S.
Mongrane, Joe, woodsman, Ten Saw Mill Units (Mass. For. Dept.).
Montgomery, Ray C., Capt., Camp Funston, Ft. Riley, Kan., forest ranger, U. S. F. S.
Montgomery, W. Erdmann (Mt. Alto, '13), 2nd Lt., 335th Regular F. A., Camp Pike, Ark., Pa. Dept. For.
Moore, Barrington, Capt. (Yale For. School, '08), U. S. F. S., France.
Moore, M. M. (Oregon Ag. College), Troop A, 1st Cav., Ft. D. A. Russell, Wyo.
Moore, Louis R. (Biltmore), Canadian Eng. (For.), in England.
Moore, Walter M. (Univ. of Minn., '09), Lt., Signal Corps, Wood Inspector, Wash., D. C.
Morris, James G., 3rd Bn., 4th Bat., Seamen's Barracks, Mare Island, Cal.
Morrison, J. W. (Penn. State, '20), Amb. Corps.
Morrison, Tom, Co. A, 10th Engineers (Forest), Am. Exped. Forces, France, U. S. F. S.
Morrison, W. N. (Penn. State, '20), Amb. Corps.
Morton, J. Newton (Mt. Alto For. Acad., '16), Co. C, 1st Bn., 10th Eng. (For.), Pa. Dept. For.
Mosch, Walter (student at Mt. Alto), Co. E, 4th Bn., 20th Eng. (For.), A. E. F., Pa. Dept. For.
Moulthen, Fred (Mont. For. School), U. S. Marines.
Moyer, Marvin H. (Mt. Alto, '16), Co. B, 5th Bn., 20th Eng. (For.), A. E. F., Pa. Dept. For.
Muncaster, Roy (Univ. of Wash., '17), Forest Regiment, France.
Munro, Willis (Yale, '12), Plattsburg, N. Y.
Murphy, Frank T. (Penn. State, '14), 20th Engineers (Forest), American Univ., Wash., D. C., U. S. F. S.
Murphy, E. C., 2nd Lt., U. S. A. (Univ. of Wash., '20).
Murphy, R. A. (Yale For. School, '18), Coast Patrol, stationed at Gibraltar.
Musser, Ralph W. (Mt. Alto, '17), Co. B, 305th Fld. Art., Camp Lee, Petersburg, Va., Pa. Dept. For.
Mutz, George, forest ranger, U. S. F. S.
Muzzal, A. H. (Univ. of Cal., '16), 10th Engineers (Forest).
Myers, Edgar (Cornell, '17), 10th Engineers (For.).
Myers, Frank B., 6th Training Camp, Co. E, 316th Engrs., Camp Lewis, American Lake, Wash., forest assistant, U. S. F. S.
Myers, Reynolds V. (Biltmore), senior non. com., 10th Eng. (Forest).

NAEGLI, Fred (Univ. of Minn.).
Naramore, David C. (Biltmore), 20th Engineers (Forest).
Nash, Royal F. (Yale ex., '08), Capt., 329th Fld. Art., Regimental Adjutant, Camp Custer, Battle Creek, Mich.
Neigle, William (Yale, '04), 20th Eng. (For.).
Nelson, Enoch W., grazing assistant, U. S. F. S.
Neasmith, John J., 20th Eng. (Forest), (Syracuse, '17).
Nelson, C. A. (Mont. For. School, ex '19), Training Camp, American Lake, Wash.
Nelson, Oscar Leo, 20th Eng. (For.), U. S. F. S.
Nelson, Ralph (Univ. of Minn.), Co. 88, U. S. M. C., Marine Barracks, Phila., Pa.
Nevitt, John V., forest ranger, U. S. F. S.
Newby, Arthur C., 20th Eng. (For.), American Univ. Campus, Washington, D. C., patrolman, U. S. F. S.
Newman, Nelson F. (Yale, '18), 68th Co., 164th Depot Brigade, Camp Funston, Fort Riley, Kan., U. S. F. S.
Nichols, Frank Q. (Wyman Sch. Woods, '16), Sgt., 20th Eng. (For.).
Nicholson, Nels O. (Univ. Mich. For. School), 10th Eng. (For.).
Nordstrom, Edw. E., woodsman, Ten Saw Mill Units (Mass. Forestry Dept.).
Norman, J. Nichols (Yale, '15), 1st Inf. Co., O. T. C., Camp Devens, Mass.
Norton, J. Newton (Mt. Alto, '16), 10th Engineers (Forest), Co. C, France.
Norton, Thomas E., 20th Engineers (Forest), American University, Washington, D. C., for. ranger, U. S. F. S.
Norton, Dan L. (Notre Dame and Milwaukee), 10th Eng. (For.), Co. A, A. E. F., France.
Norton, Fred (Ohio State Univ., '17), Royal Flying Squadron, Ontario, Canada.
Norris, Conrad, Concrete, Washington, patrolman, U. S. F. S.
Nye, Elmer L., 20th Engineers (Forest), American Univ., Wash., D. C., U. S. F. S.

SALE OF TIMBER, KLAMATH INDIAN RESERVATION.

NORTHERN MOUNT SCOTT UNIT.

SEALD BIDS, MARKED OUTSIDE "BID, Northern Mount Scott Timber" and addressed to "The Superintendent of the Klamath Indian School, Klamath Agency, Oregon," will be received until 12:00 o'clock noon, Pacific Time, Tuesday, May 28, 1918, for the purchase of timber upon about 17,000 acres within Townships 29, 30 and 31 South, Range 7 East. The sale embraces approximately 100,000,000 feet of Yellow Pine and 1,000,000 feet of White Fir. The cutting of White Fir will be optional with the purchaser. Each bid must state for each species the amount per thousand feet, Scribner decimal C, log scale, that will be paid for all timber cut prior to April 1, 1921. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs by three-year periods. No bid of less than Three Dollars and Thirty-five Cents per thousand feet for Yellow Pine, and Fifty Cents for White Fir during the first period will be considered. Each bid must be submitted in duplicate and be accompanied by a certified check on a solvent National Bank in favor of the Superintendent of the Klamath Indian School in the amount of \$5,000. The deposit will be returned if the bid is rejected but retained if the bid is accepted, and the required contract and bond are not executed and presented for approval within sixty days from such acceptance. The right to reject any and all bids is reserved. For copies of the bid and contract forms and for other information application should be made to the Indian Superintendent, Klamath Agency, Oregon.
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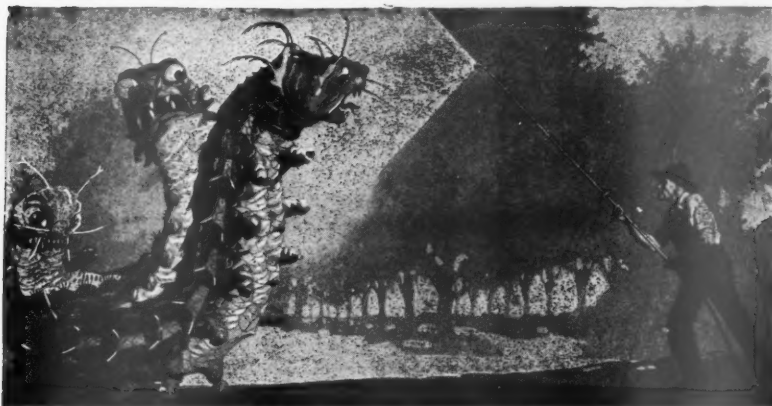
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Olson, O. A. (Mich. Ag. College, '16).
Olson, Richard V., 20th Eng. (For.), American Univ. Tr. Camp, Washington, D. C., patrolman, U. S. F. S.
Opalka, William P. (Univ. of Mont.), 20th Eng. (For.).
Orr, Ronald H., 20th Eng. (Forest), (Biltmore For. School, '09).
O'Shea, Thomas E., Woodsman, Ten Saw Mill Units (Mass. Forestry Dept.).
Otis, David B. (Biltmore), 1st Lt., Camp Dix.

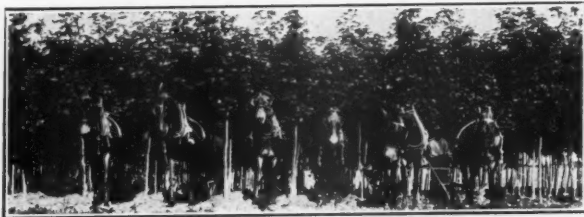
PAETH, William J. (Yale For. School, '12), Base Hosp., Unit 46, U. S. A. Med. Res. Corps, Bellingham, Wash.
Palm, Will, 20th Eng. (For.), U. S. F. S.
Pagter, Lawrence B. (Yale, '11), Co. F, 4th Bn., 20th Eng., forest examiner, U. S. F. S.
Paine, F. R. (Yale For. School, '14), 1st Lt., Co. D, 109th Reg. Engr., Camp Cody, Deming, New Mexico.
Paine, Topliff O., forest ranger, U. S. F. S.

Park, Edwin C., Av. Branch, Ft. Sam Houston, San Antonio, Tex., patrolman, U. S. F. S.
Parker, Roscoe S., Capt., 10th Cav., Ft. Huachuca, Arizona.
Parker, T. W., American Lake, Washington.
Partridge, Herbert E. (Biltmore).
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Paxton, Percy J. (Yale, '09), 1st Lt., 139th Field Art., Camp Shelby, Hattiesburg, Miss., U. S. F. S., Forest Examiner.
Peabody, Joseph, 20th Eng. (Massachusetts For. Dept.).
Peachey, E. C., Co. B, 10th Eng. (For.).
Peck, Allen S., Major, 10th Eng., forest insp., U. S. F. S., France.
Peck, E. C. (Yale For. School, '18), 10th Co., 3rd Bn., Camp Devens, Ayers, Mass.
Perkins, W. E. (Yale ex., '19).
Perry, Edgar L., 10th Engineers (Forest), American Exped. Forces, France, U. S. F. S.
Perry, Jr., R. E. (Cornell, '17), 10th Engineers (Forest).
Peryam, John C., 20th Eng. (For.), Camp, American Univ., Washington, D. C.
Peterson, C. I. (Penn. State, '20), 10th Eng. (For.).
Peyton, Hugh (Univ. of Mont.), 20th Eng. (For.).

Phillips, Reuben (Univ. of Minn.), 20th Eng. (For.).
Pilcher, Rufus J., School of Military Aeronautics, Austin, Tex., forest ranger, U. S. F. S.
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Plummer, Donald (Univ. of Wash., '20).
Port, Harold F. (Mt. Alto For. Acad., '16), Co. A, 1st Bn., 10th Eng. (For.), France, Pa. Dept. For.
Porter, O. M. (Yale For. School, '15), Lt., 10th Engr. (For.) A. E. F., France.
Porter, Harry C., Co. K, 361st Inf., Camp Lewis, Tacoma, Wash.
Post, Manlius J. (Yale, '13), Co. B, 5th Bn., 20th Eng. (For.).
Powell, Harry A., British Army (Univ. of Wash.).
Powers, James E. (Mt. Alto, '15), Master Engineer, Hdq. Ditchmt., 103rd Engr., Camp Hancock, Augusta, Ga.
Powers, Victor S. (Univ. of Wash., '16), Battery A, Wash. Sig. Corps.
Pretat, Robert E. (Yale ex., '17), Cadet, Av. Section, S. E. R. C., A. E. F.
Prichard, R. P. (Yale For. School, '09), Fort Niagara, N. Y.
Prince, Edmund H., 2nd Lt. National Army.
Pryse, E. Morgan (Univ. of Mont.), 10th Eng. (For.), forest assistant, U. S. F. S.
Putnam, H. N. (Mich. Ag. Col.), U. S. F. S.

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Quivey, Horace B., 20th Eng. (For.), Camp, American Univ., Washington, D. C.

RAINSFORD, W. K. (Yale For. School, '06).
Ramsdell, Williett F., Sgt., 10th Eng. (For.), Co. B, A. E. F., France, deputy forest supervisor, U. S. F. S.
Raine, Burton D. (Ohio State Univ., '17), Av. Rase, Frederick W., Capt., 8th Co., 364th Suf., Camp Lewis, American Lake, Wash., surveyor, U. S. F. S.
Rand, E. A., 1st Sgt., 20th Eng. (Forest), (Univ. Me.), U. S. F. S.
Reber, H. E. (Penn. State, '18), timber inspection.
Reid, Thomas B. (Yale, '13), 20th Eng. (For.).
Reid, Thomas P. (Yale, '11), Co. E, 6th Bn., 20th Eng. (For.), Am. Exped. Forces.
Rendall, Raymond E. (Mass. Ag. and Univ. of Me.), U. S. F. S.
Renier, Earl S., Canadian Troops (Eng.), Carberry Tower, Musselburgh, Scotland.
Riblett, Carl H., forest ranger, U. S. F. S.
Rice, A. M. (Univ. of Cal., '16), 20th Engineers (Forest).
Rice, Herbert A. (Short Course Yale, '16), has enlisted in Av. Branch of the Navy as a L. M. M. (Aviation).
Richards, E. C. M. (Yale For. School, '11), Special Relief Agt., Amer. Committee on Armenian and Syrian Relief, Tahrir, Persia.
Richards, H. E. (Penn. State, '16), 10th Eng. (For.).
Richards, Allison M. (N. Y. State College, '17), Co. A, 5th Bn., 20th Eng. (For.), formerly with Hineckley Fibre Co., Hineckley, N. Y.
Richardson, R. W. (Mont. For. School, ex '20), Training camp, American Lake, Wash.
Ricketts, Howard B., clerk, U. S. F. S.
Ridings, Troy G., 10th Engineers (Forest), A. E. F., France.
Ringland, Arthur C., Capt. 10th Eng. (Forest).
Ringland, Stanley L. (Univ. of Minn., '14), 10th Eng. (For.), France.
Rixson, C. L., forest clerk, U. S. F. S.
Roberts, Archer E., 20th Eng. (For.), forest ranger, U. S. F. S.
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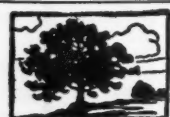
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Wood, Arthur P. (Yale ex., '18), Provisional Co. No. 1, Amer. Ord. Base Depot in France, Watervliet Arsenal, Watervliet, N. Y.
Wood, Homer (Ohio State Univ., '17), Quartermaster's Dept., O. N. G.
Woodruff, James A., Lt.-Col. commanding 10th Eng. (For.), France.
Woodward, Ward N. (Univ. of Mont.), 20th Eng. (For.).
Woods, J. B., 1st Lt., 10th Eng. (Forest).
Woolsey, Theodore S., Jr. (Yale, '02), Maj., 10th Eng. (For.), Am. Exped. Forces, France.
Work, Herman (Penn. State, '10), 1st Lt. 10th Eng. (For.), deputy forest supervisor, U. S. F. S.
Wright, Clifford A. (Univ. of Wash., '17), Sgt., Quartermaster's Corps, Camp Johnson, Jacksonville, Fla.
Wulff, Johannes (Yale For. School, '17), Co. C, 504th Engrs., Serv. Bn., A. E. F.
Wyatt, Robert L. (Wyman Sch. Woods, '16), Co. B, 10th Eng. (For.).
Wyman, Hiram (Univ. of Minn., '15), 10th U. S. Eng. (For.), A. E. F., France.
Wycoff, Garnett (Ohio State, '13), 10th Engineers.
Wyllie, James A., Co. F, 10th Eng. (For.), A. E. F., France.
Wynne, Sedman (Yale, '10), Dept. of Military Aeronautics, Ohio State Univ., training as second officer of Av. Sec.

YEOMANS, E. J. (Yale For. School, '12), 20th Eng. (For.), forest ranger, U. S. F. S.
Young, James E., 20th Eng. (For.), forest guard, U. S. F. S.
Young, L. P., 2nd Lt. Inf. (Univ. of Wash., '17).
Youngs, Lt. Homer S., 16th U. S. Inf., care of Adjutant General, War Dept., Washington, D. C., U. S. F. S.

ZAHN, George D. (Univ. of Wash., '20), Coast Art. Corps.
Zeller, R. A., Co. E, 161st U. S. Inf., Camp Mills, L. I., N. Y., forest assistant, U. S. F. S. (Report Continued in April Issue.)
Ziegler, E. A. (Direc. Penn. State For. Acad., Mt. Alto), Capt. Coast Art. Serv., Box 129, Fortress Monroe, Va., Pa. Dept. For.
Ziegler, Robert H., forest ranger, U. S. F. S.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

On January 8, 9 and 10, there was held in Quebec, at Laval University, a meeting which marks a great forward step in the Province, i. e., a meeting of the graduates of the School of Forestry of the Quebec Government. Nearly all of the active and a number of the associate members of the Society were present. Several very interesting papers on important subjects were read, "Forest Protection from Fire," by Mr. B. Guerin, Manager of the Southern St. Lawrence Fire Protective Association; "Tree Planting Along Our National Highways," E. Gravel of the Quebec Forest Service; "Insects Injurious to Ornamental Trees," Prof. G. Maheux, and others. The Society has a membership list of over

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thirty-five. So far the Society is exclusively French-Canadian in membership but it is hoped that it will open its doors to non-French members. A union of professional foresters will be of great benefit in improving forestry conditions and in encouraging better handling of our woodlands.

The week of February fifth will be a memorable one in Forestry annals in Canada. The Canadian Lumbermen's Association held a most successful meeting and banquet. Important matters were discussed, good papers read and Mr. Gerald Power, one of our broadest minded and most progressive lumbermen, was elected President.

On the 6th the business meeting of the Canadian Forestry Association was held in the morning, Mr. Dennis of the Canadian Pacific Railway was elected President, and Mr. Smeaton White of the Montreal Gazette was added to the directorate. A very interesting discussion took place as to the best way to make reports on forest fires and the uniform keeping of statistics. In the afternoon Mr. Pringle, the Dominion Paper Controller, made a speech, in which he told about the strides the paper industry in Canada had made and gave it as his opinion that there was great necessity for scientific study of the forest resources of the country and their proper conservation.



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FILIBERT ROTH

and management. He said that while it was necessary that the press should have enough paper at a reasonable price, it was not fair to give them paper at a loss to the manufacturer and that they should begin economy at home by cutting down waste, such as Sunday editions, comic supplements and so forth. There is great need for saving paper and much could be done along these lines.

On the evening of the sixth, the Annual Meeting of the Canadian Society of Forest Engineers was held at the University Club, preceded by a dinner. The following officers were elected: President, Ellwood Wilson, of the Laurentide Company; Vice-President, J. H. White, Assistant Forester of Ontario; Secretary, Clyde Leavitt, of the Commission of Conservation, and Secretary-Treasurer, T. W. Dwight, of the Dominion Forest Branch. A very interesting paper was read by Mr. Atkinson, of the Spanish River Pulp and Paper Company, on a forester's work, calling attention to the many ways in which a forester's special knowledge might be of use to a pulp and paper company. Mr. Atkinson has made a special study of water regulation and has developed his subject in a very interesting way. He is collecting some very interesting and unusual information. Mr. G. H. Prince, Forester to the New Brunswick Government, reported on the progress of his work and on the reorganization of the Department of Lands and Forests in that Province. This Society is doing excellent work in developing and conserving the forest resources of Canada and in fostering an esprit de corps among foresters.

On the morning of the seventh, a symposium on the substitution of wood for coal in order to make the best of the shortage of the latter, was held under the chairmanship of Clyde Leavitt. Mr. A. F. Hawes, of the United States Forest Service, made a very interesting address. Other speakers were, Mr. G. C. Piche, of the Quebec Forest Service; Mr. E. J. Zavitz, of the Ontario Forest Service, and Mr. G. H. Prince. Many interesting points were brought out at this meeting.

In the afternoon the first meeting of the Woodlands Section of the Canadian Pulp and Paper Association was held. This meeting brought together for the first time the men who are directly interested in woods operations, managers of logging departments, woods superintendents and woods foremen, and proved most interesting. F. A. Sabbaton, Assistant to the President of the Laurentide Company, read a very interesting paper showing the results accomplished in the mills in efficiency and increased output, from better education, better housing and more recreation for the men. He showed also that the principal expenditure in the woods was for labor and that the total labor in the woods exceeded that in the mills. His conclusion was that

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better methods must be thought out and adopted and especially that the class of labor used in the woods should be better trained, housed and fed. The discussion on this paper was very interesting, some of the older lumbermen holding that conditions were too good already for the men and that machinery could never be introduced in this country, east of the Rockies, to advantage. The point was brought up that fire-fighting methods which must be used at even greater distances from railroads than in logging had been practically revolutionized by better organization, by training rangers and by introducing machinery. A paper on gasoline tractors for log hauling was read by Gerald Power, who stated that he was using two 70 horsepower engines of this type and had found them very satisfactory on a haul of seven miles. He gave figures for costs and other interesting information. The following officers were elected: President, Gerald Power, River Ouelle Lumber Company; Vice-President, Angus McLean, of the W. C. Edwards and Bathurst Lumber Companies; Directors, Messrs. Black, of the J. R. Booth Company; Mack, of the Brown Corporation; Anderson, of the Shives Lumber Company, and Wilson and Small, of the Laurentide Company. Mr. Gaylord, of Neha-san-ee Park, joined in the discussion. After the meeting it was proposed by some of the men present that a school should be held each year for scalers, foremen of drives and woods operations, and any other men who cared to work in the woods. Steps will be taken to put this into effect. It was also proposed to have meetings with moving pictures or lantern slides and practical speakers in the small towns and villages in districts from which the woods operatives were recruited, in order to give the men a better idea of their work and its importance to the industry. Co-operative lumbering for those firms working on the same watershed and who already co-operate in driving, sorting and fire protection was also discussed favorably.

In the evening a meeting of all the co-operative fire protective Associations was held and it was decided to form a joint association called the Quebec Forest Protective Association, on whose Board of Directors the Minister of Lands and Forests would sit as a member, and which would have charge of all matters which were of common interest. This marks a long step ahead in fire protection and will undoubtedly make for closer relationship and greater efficiency.

(Report Continued in April Issue.)

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IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by co-operation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

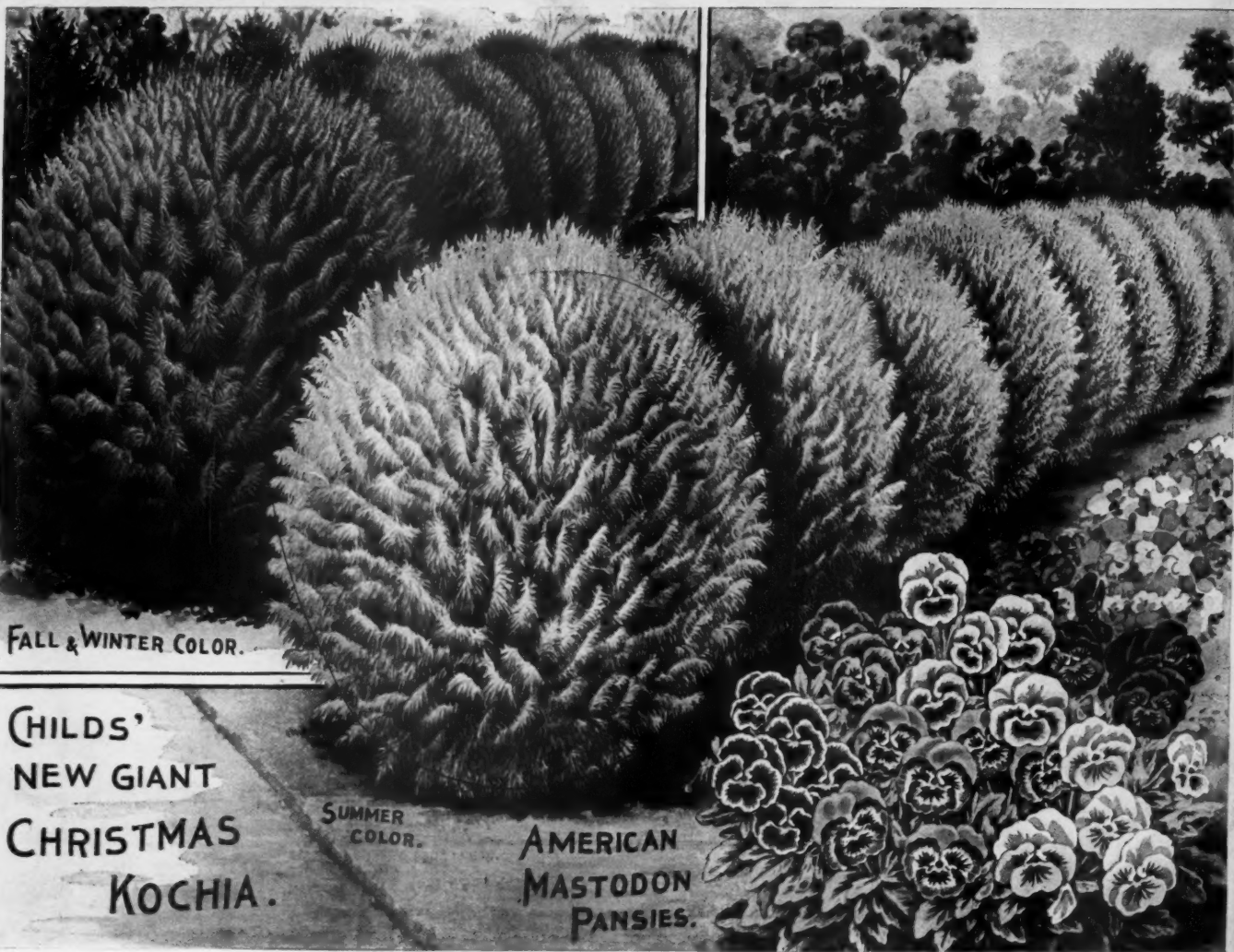
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